

Devonian

Iowa, Michigan, Illinois, Missouri
Wisconsin, Minnesota

July 22

Visited S side Long Lake. Locality of abundant *Cystina* at NE $\frac{1}{4}$ 36. was undoubtedly derived from locality about $\frac{1}{3}$ mile north of Alpena Co. line on east side sec. 31. Rock in place at NE $\frac{1}{4}$ 36 is Genshaw just below *G. romingeri*.

Genshaw on new maps and on a sign at Long Lake is spelled Genschaw.

Michigan Alkali Co at Rogers City is now part of Wyandotte Chemicals. Michigan Limestone & Chemical Co. on engines.

Big Oy in Alpena is Huron Portland Cement Co.

Ask Reimann to be careful about wax used in crinoid models.

Digest of Graham Mss.

Section 9. - sec. 6-32N-9E. Low bluff 16' high extending NW & commencing $\frac{1}{2}$ mi. from Lake shore. Traceable for a mile or more Coral ls. Rominger p. 50.
Rockport ls.

Section 10 - G. loc. 19. - SW $\frac{1}{4}$ 36-33N-8E. - Sink holes just N of county line in Presque Isle Co. A dozen separate depressions. Upper 20' or 30' are basal Long Lake = Rockport, below is the blue Bell shale.

Section 11 Loc. 37 - Grand Lake Ledges 6-33N-8E.
c - thin-bedded calcarenites with Ceratopora.
b - fine grained compact ls. with large corals
a - shaly argillaceous calcarenites with massive layers.
This is the Rockport ls.

Section 12 ~~loc 25~~ ^{SW} SW cor 36 32N-8E
SW $\frac{1}{4}$ SW $\frac{1}{4}$ 36-33N-8E = loc. 75
SW $\frac{1}{4}$ SE $\frac{1}{4}$ 35-33N-8E = loc. 18
SW $\frac{1}{4}$ NW $\frac{1}{4}$ 35 (Rabiteaus form) = loc. 14.
all Genshaw

Sect. 13 Abandoned shale pit A.P.C. Co., NE $\frac{1}{4}$ SE $\frac{1}{4}$ 18-32N-9E = loc. 31. Said to be about 20' above level of Lake Huron or at 600'
Well in Genshaw ridge S of pit shows 13' of ls and 35' of shale.

Sect 14 - S of Middle Lake and between it and Long Lake Valley is the second lo. terrace. Can be traced from shore S of A.P.C.Co. clay pit. NW through sec 19-32N-9E & secs. 13, 11 and 3, 32N-8E. Exposures are at east end Long Lake, sec. 11, & near school house S of county line (E side Sec. 3).

Impure calcarenite, many silicified fossils. 23' assigned on basis of formation 10 in Churchill well equalling the Genabaw.

Section 15 - Waseys Well (El Cajon Clay) near E line sec. 19-32N-9E, 20' bluish clay = Bed 9 of Churchill well. Fossils are *Sp. numeratus*, *S. dermiosa*, *L. perplana*, *C. coronatus*, *C. sp.*, *Athyris fultoniensis*. This must equal our upper Ferron Point. ~~This is not related to anything at El Cajon~~

Sect 16 - El Cajon Beach 10-31N-9E. (loc. 76) On beach & just behind it is clay with *Sp. numeratus* & *C. coronatus* same as at A.P.C.Co. pit.

Sect. 17 Terrace S of Hell Creek appears to be continuation of the one behind El Cajon Beach. Section is opened where terrace is crossed by tracks of

A.P.C.C., 2 mi. S. of clay pit
NW $\frac{1}{4}$ 30-32N-9E (loc. 30)

G. romingeri is common with large
Deluzophodia, large *Atrypa*, *Athyris*, *Sp. owenii*,
S. macrea, etc. This is Henshaw and
probably same as upper bed in A.P.C.C.
pit.

Sect. 18. Sec line between secs. 24 & 25 - 32N-8E.
~~Somewhat higher than 17 but essentially~~
somewhat higher than 17 but essentially
same horizon.

Sect. 18a Hell Creek Fall # SE $\frac{1}{4}$ 23-32N-8E
G loc. 10. I think this should be NE $\frac{1}{4}$ 28.

Sect. 19. Locs. 32, 33a and 33 - begin at fork of
road S of Long Lake and extend NW to
Summersville on the lake. ~~Loc~~ The
exposures are of one bed but loc 34
is shalier beds a little lower down.
This is Henshaw.

Sect. 20 - Loc. 27 - Terrace crowning N + S section
lines midway between secs. 25 & 26 - 32N-
8E. Beds appear to be above those of
Sect. 19. *Cystina alpenensis*. This is upper
most Henshaw of the Wessel Road.

Sect. 21 - Outcrops on Long Lake Rd. between sec. 26 & 27-32 N-8 E. This is Killians outcrop of A57 = G. loc. 7. 0.2 mi. farther south is a black shale (loc 6) abounding in S. solidicosta.

Sect. 22. - Misery Bay or Little Thunder Bay (NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 15-31 N-9 E = loc. 20) - large sink at head of inlet. Grabau gives robust Atrypa, G. romingeri & Delphyophoria = Genshaw. According to our map this is the head of El Cajon Bay.

Grabau's name of loc.
located Misery
Bay incorrectly

Sect. 23 - loc. 26 - Thunder Bay Island.
Low ledges ls. Stromatopora most abundant, up to 5' in diameter. On east side island ls. separated by bituminous beds. Black shale contains Strophodontia costata & branching Favosites. Grabau says these may represent the beds 50-75' below the top of the Alpena (= Killians) or more likely the beds 120' below surface in well 26. Black shales of sect. 21 are undoubtedly the same. The same rock occurs on Sugar Island

Locality 42 (Grabau's locality) is described in pages 202-204 of Grabau's "Stratigraphy of the Traverse group of Michigan," in Lane's Report of the State Board of Geological Survey for the Year 1901 (publication date 1902). According to Grabau (p. 202) locality 42 is the same as Winchell's locality 861. The Petoskey Portland Cement Company (now owned and operated by the Penn-Dixie Portland Cement Co.) cut back the shore exposures of Winchell's time in the development of the quarry wall. Letters A - I after Grabau's locality number 42 are units in Grabau's section. In my opinion the section, described and measured by Grabau, was somewhere near the eastern end of the Penn-Dixie quarry. I believe that Unit D is most likely Pohl's "Lower Blue Shale" of the Gravel Point formation. Grabau (p. 203) states that unit D has a thickness of 3 feet, which is greater than that noted by other workers.

Sect. 24 Outcrop in SE cor sec. 1 - 31N-8E - loc. 75c.
and extending along section line E.
across RR of A.P.C. Co. and between secs.
6 + 7 (31N-9E) for $\frac{1}{2}$ mile or more
yellowish gray, fine-grained calcarenite.

Sect. 25 - Long Lake Rd. nr. school + Town Hall.
NW $\frac{1}{4}$ 25 (loc. 3) and SE $\frac{1}{4}$ 27 (loc. 4) - 32N-8E.
Loc 4 is a crinoidal ls. with *S. solidicosta*
c. Total thickness is 20'.

Sect. 26 At school house sec. 11 - 31N-8E. (loc. 75b.)
one mile E of Long Lake Rd. Beds about
30' above sect. 25. This is Alpena.

Sect. 27 - Outcrops in rd. SW $\frac{1}{4}$ sec. 12 - 31N-8E
loc 75. 20-25' above preceding. Porous
x-line ls. with Pentamerella

Sect. 28 Roadside farm near center east side
3 - 31N-8E. continuation of 27. Porous
calcareous, many bryozoa (fenestellid)

Sect. 29 Mid-line sec. 3 - 31N-8E. a short distance
from Long Lake Rd. (loc. 1b). Above preceding
sections but below Qy.

Sect. 30. Quarries in N. end of Alpena
Fox Qy, SE $\frac{1}{4}$ 14 - 31N-8E.; Collins Qy..
SW $\frac{1}{4}$ sec 13 - 31N-8E. Reef masses

A well on Dock St. showed high beds.
6' of clay. The clay is overlain
by a thin-bedded & fine calcarenite
(loc. 1c) from 2-3" thick, weathering
brown. It is filled with a small
Cyrtina umbonata, Strophodontia,
Sp. mucronatus & Atrypa.

Sect. 31 Qy. Alp. Port. Cement Co. N.# 1/4 sec. 24-
31 N-8 E (loc. 9). In upper 30' of
Alpena ls. reefs well shown

Sect. 32 Warner Brick yard - SW 1/4 NW 1/4 27-31 N-8 E
Following species from thin-bedded ls.
with shale partings of 1'.
Mugisto. latus? 6-8' of clay
Dolot. triadactylus exposed
Cyclaster pyramidatus
Fav. alpenensis
F. hamiltonensis
Striatopora rugosa
Dendropera alternalis
Craspedophyllum archiaci
Schizophoria propinqua
Rhip. vanuxemi
Sp. andaculus
D. romingeri
Pent. papilionensis
Cyrtina hamiltonensis
Stroph. solidicosta
Cryptonella

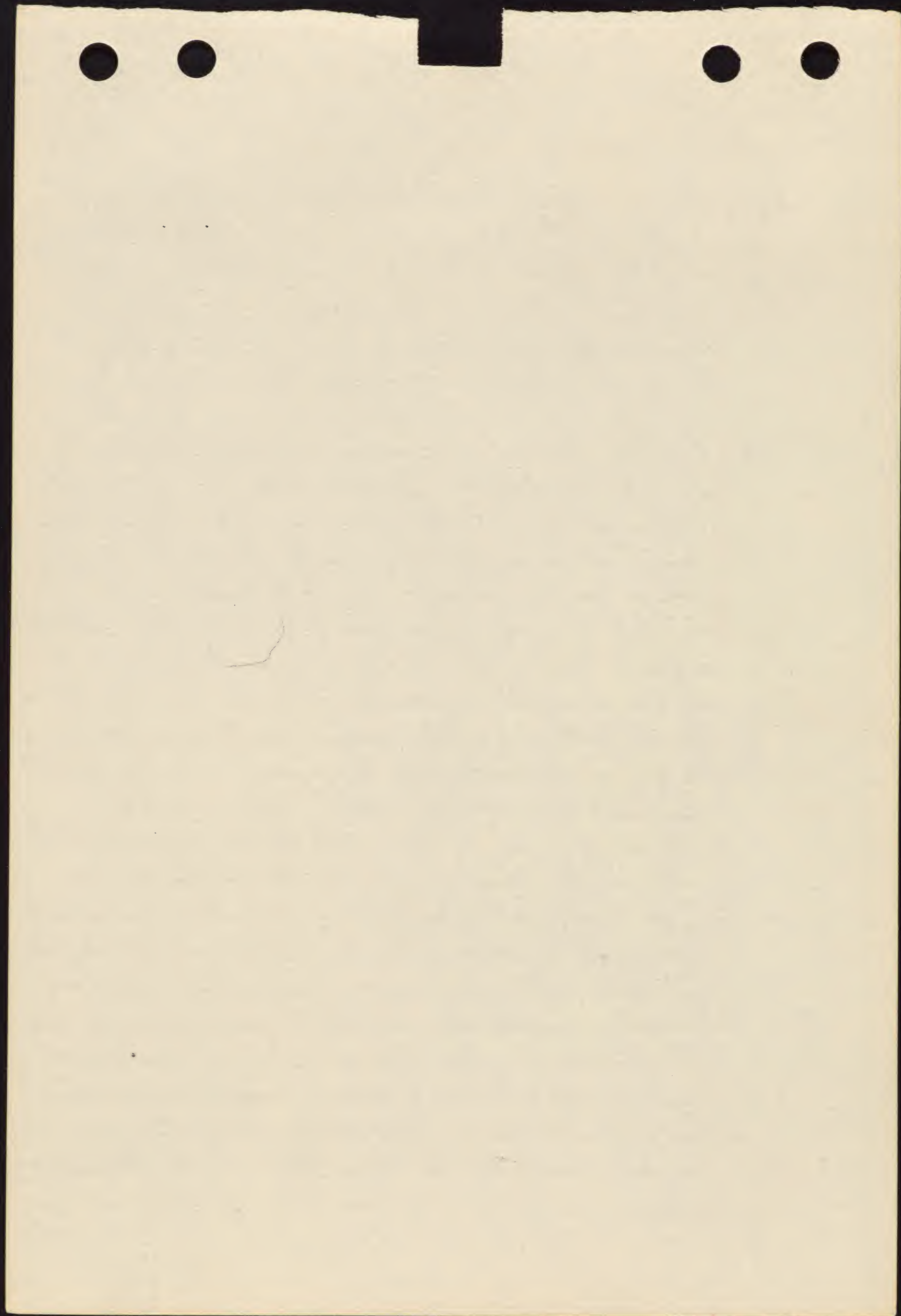
Probably Potter Farm
10/14/13

Sect. 33 Stony Point SW $\frac{1}{4}$ & SW $\frac{1}{4}$ 27-31 N-8 E.

Huban thinks 100' intervene between here and the upper Alpena ls. of the quarries. Athyris, Pentamerella, Sp. mucronatus, Sp. consobrinus, Cyrt. humiltonensis, S. deirussa suggest lower Norway Point. S. loc. 22.

Sect. 34 Potter Farm SE cor. 20-31 N-8 E.

S. loc. 77 to SE. cor. sect. 19 = loc. 78.
4 terraces. Beginning at Thunder Bay River is a clay underlying the river, said to be same as at Warner Brick Yard. Succeeded by thin bedded argillaceous ls. cropping out on road near cemetery. Corals are common here. Then follow 15' shales. Then follows a terrace ~~with ls.~~ capped by ls. with Favosites & Eldiostroma cylindrica. Then follows thin-bedded calcilutites alternating occasionally with fine-grained calcarenites. Corals abundant. Beyond section line (SE. cor. 19) in a flat field occur numerous loose blocks containing Stromatopora & corals. 4th terrace occurs just E. of school in Sec. 19. Total rock exposure in this section is between 40 + 50'. beginning at Stony Pt ls. at Terrace 1.



Sect. 35 Stone crusher W. of school house near center S line Sec. 19. = loc. 79.
 Thin-bedded ls. with bygonia + Stroms. ----- 1' 6"
 Athyris, S. erratica, Conocardium
 Cyliodrophyllum
 Bituminous sh. ----- 1" - 6"
 Ls. similar to higher beds ----- 1' 2"
 Cyliodrophyllum, Conocardium, Athyris
 Strophodontia erratica.
 Cinoidal ls. ----- 4' 6"
 The Conocardium beds overlying section 34.

Sect. 36 4-Mile Dam; Fletcher Dam; = loc. 21
 7-31N-8E. Formerly called Broadwells
 Sawmill. Reef in river bottom. Beds
 dip 8° downstream on flank of reef.

Sect. 37 Boone Co. Dam, 7-Mile Dam. SW 1/4 2-31N-7E
 = loc. 24. Rominger's list (p. 44) includes
Sp. divanica from shales. Along left
 bank of stream below dam there are
 15' of strata, at base 4' uncracked with
 small corals + Spiifer. Followed by 1'
 of sub-x line ls. with Cyrtina umbonata
 (small variety). Above Cyrtina beds
 are 6' bluish sh. unfossiliferous. These
 are succeeded by fossiliferous calcareous
 beds. Highest beds are 20' above base
 of section and are exposed between
 gorge & highway. Fossils are same as at

~~base~~ section (base) on south side of river at Norway Pt.

According to Rominger the same beds found at Boom company's dam (Ironbridges mill) crop out again under the bridge which crosses the north branch of Thunder Bay River (NE $\frac{1}{4}$ 32-32 N-7E). If this correlation is correct, a distinct southward deflection of the strike of the strata is indicated. This, and a flattening of the dip as the strike approaches an east-west direction, is also indicated by other strata.

Sect. 38 Mustang well 34-32 N-6E. See Rominger pp. 45-46.

Section 39 = loc. 23. Shore of 11-30 N-8E. Estimated by Grabau to be 20 or 30' above the Conocardium bed of Sect. 35 (loc. 79). According to G. the interval seems to be occupied by soft shales.

Sect. 40 John J. McTellans clearing SE $\frac{1}{4}$ 17-31 N-7E = loc. 102). Grabau's goniatite locality

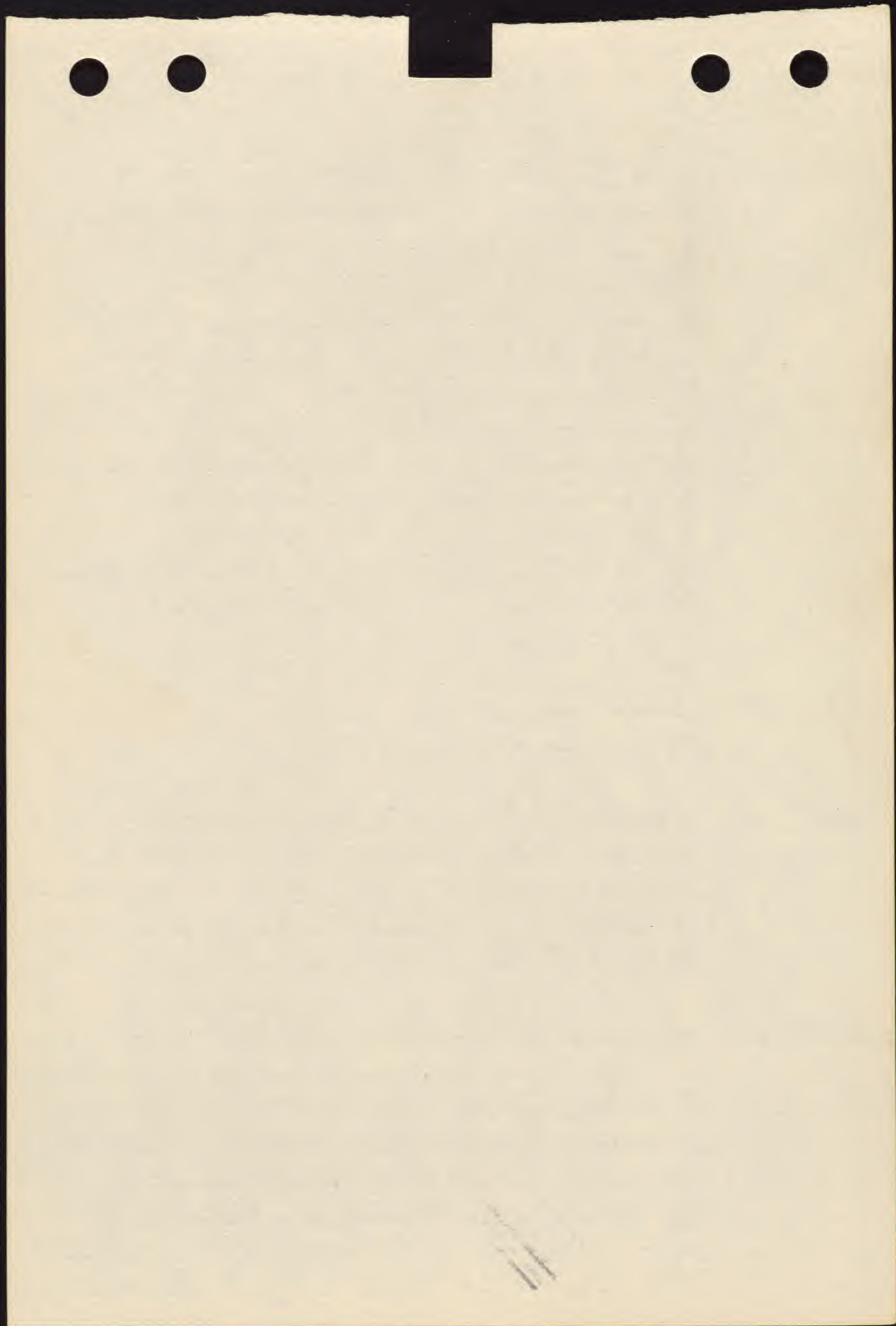
Sect. 41 Bolton - SW $\frac{1}{4}$ 5 - 32 N - 7 E. (loc. 95)
about $1\frac{1}{2}$ mi. N W. of Bolton Sta. several
quarries in lower Alpena.

Top layer is crinoidal ls. containing
heads & joints of Dolotocrinus. Below
occurs ls. & sh. with brachs. Below
this crinoidal ls. again to bottom of
qy. which is about 8' deep.

Sp. pennatus	Pent. papilionensis
Sp. mucronatus	At. utricularis
St. concava	At. spinosa
St. solidior this	Ag. hamiltonensis
St. erratica	P. flabellum
St. perpluma	
St. naeaea	
St. demissa	
St. jinia ?	

Sect. 42 Krakaw ls. hill (NW $\frac{1}{4}$ 20 & NE $\frac{1}{4}$ 19
34 N - 7 E. (loc. 86). Thin bedded ls.
with Acervularia, St. naeaea. A continuation
of ridge S of Grand Lake & comprises
Grand Lake ls. = Rockport

Sect. 43. Terrace running NW-SE. through
NE cor. 33 & NW cor 34 - 34 N - 6 E (loc. 85)
Direction of terrace is N 50° W. Thin
bedded, impure calcarenite. Fossils
are silicified. A large form of
G. romingeri predominates but
with it a large Atrypa & Productella
This is Genesaw. List follows:



Strom. globulifera

S. mucronatus

S. oregoni

S. johnsoni

Productella

S. romingeri robust

Atrypa

Athyris murchisoni

Cranaea luecklaeni

S. denissa

S. erratica

S. solidicosta

S. altidorsata

P. flabellum

On farm at summit of ridge a well revealed

d Soil 3'

c Lo. like that on cliff 35'

b blue clay (El Cajon) 8'

a Black lo. 21.5'

From the blue clay (b) were obtained
C. coronatus, *A. reticularis*, *S. johnsoni*,
S. mucronatus, *Schiz. iowensis*, *Productella*
E. luecklaeni, *Cyst. hamiltonensis*,
S. denissa, *P. flabellum*.

Tenaces passes S of Lake Augusta
and appears to be continuous with
that along S. border of Long Lake. It
has been traced through sec 34, T34N
+ sec. 2 + 1, T33N-16E. On sec. 35
SE of Lake Augusta makes a Southward
restrant. From here it extends
along tp. line between T33 + T34.

8 1/2' clay shows thinning of upper
Ferron Pt.

Higher beds of this series crop out at center section line between sec. 33+34. a $\frac{1}{4}$ - $\frac{1}{2}$ mile S of the cliff (loc. 84). Fossils + rock here resemble those of sect. 19 near Summerville.

Sect. 44 - On tp. line between 33+34 on center line of range 6 E. immediately N. of school-house (loc. 83). Crinoidal ls. with *S. johnsoni*, *Athyris incurvata*, *Phillipsastrea gigas*, *G. romingeri*. About 30' above those of preceding loc.

Sect. 45 - On center line of R 6 E a mile S of N line of T 33 N - 2 outcrops. One 100 yds. n. of town line (loc. 82), the other just S of the Catholic church beds (Posen loc. 81). The beds lie 30-40 above those of the preceding. Continuation of beds of sec. 20. This is upper Geneshaw with *Cyrt. alpenensis*.

Sect. 46 - Terrace crossing N line of 33 N between secs. 4+5 R 6 E (loc. 91). Terrace extends N 45° W. continuation of lower ridge of preceding sect.

Sect. 47 - SW $\frac{1}{4}$ SW $\frac{1}{4}$ 10 - 33 N - 8 E - loc. 80.

On woods opposite Posen ledges of Alpena Co.

Sect. 48 - On section line W side of SW $\frac{1}{4}$ of sec. 14 - 33 N - 6 E (loc 94) - Alpena Co.

Sect. 49. Terrace on sec. line between secs. 7 + 8 - 33 N - 6 E. loc 90. half-way between N line of section & R.R. Terrace runs NW & is 15-20' high. *Athyris* & *Stropheodonta* abundant. *C. coronatus* in shaly beds.

Outcrops from a mile and a half to 2 miles W. of Posen & S. of R.R. 7-8, 17-18 - 33 N - 6 E.

A mile & $\frac{3}{4}$ W of Posen (NW $\frac{1}{4}$ sec. 17 - loc. 87) half way between section line and schoolhouse no. 5 are calcilutites with *S. per plana*, *Chonetes*. $\frac{1}{4}$ mile further W. on NE cor 18 (loc 88) a low ridge running N 60° W crosses road. *Gonophoreoids* abundant.

Sect. 51 - SW cor 17 - 33 N - 6 E. (loc. 89) ls. ridge crosses section line in NW-SE direction, *Cinoides* and contains *Oratopora*.

Sect. 52 - Dunker Lake center sec. 32 - T33 N - R6 E (loc. 93). At west end of lake is a sink 60-70' in diameter & 65' deep. Section in West wall:

- | | |
|---|---------------------|
| 10. Lo. calcarenites, not well exposed | 10' |
| 9. Dolatocrinus bed - calc. sh., two silico
argillaceous blue fossiliferous calcarenites
resembling Four-Mile Dam Alpena. | 1'6" |
| Dolat. asterias | Cyt. alpenensis |
| F. placenta | Stroph. levis |
| F. limitaris? | S. concava |
| Cyath. traversensis | S. naevia |
| A. reticularis | S. solidicosta |
| Sp. cf. euryteines | G. romingeri |
| S. pennatus | Pent. papilionensis |
| Stromatopora nux | P. flabellum |
| Cyt. hamiltonensis | |
| 8. Crinoidal ls in beds 1/2 - 2' thick - Stromatopora - | 10' |
| 7. Shaly layer, similar to Dolat. bed - - - | 1'6" |
| 6. Ls like 8 but with coral masses. | 10' |
| 5. more shaly beds | 1' |
| 4. ls. like 6 | 5' |
| 3. Coralline ls. | 5' |
| 2. Carbonaceous strata | 2' |
| 1. Talus slope | 20' |
| | <hr/> 65' |

Sect. 53 McArthur's Farm 8 mi. SW. of
Crawford's Bay. (Rominger p. 52)

Sect. 54. Rainy River, 4 miles from its entrance
into Black Lake, NE of Onaway 35N-2E.
Rominger gives section of 30'-40'.

Sect. 55 - Black Lake (SW $\frac{1}{4}$ NW $\frac{1}{4}$ - 7-35 N-2E
(loc-97). 30' cliff of uniform calcilutite
with scattered x ls of calcite. Upper
Rockport.

Sect. 56 - Onaway SW $\frac{1}{4}$ sec. 6 - 34 N-2E.
loc 98 and S side sec. 1-34 N-1E.
Cheboygan Co. loc. 99. Semi-x-line
calcareous = lower Alpena according
to Grabau.

July 26, 1934

1699

(2)

Shedford Brick yards

A - Olentangy shale - 16-18 feet of gray, soft shale, weathering into lumps and blocks. It ^{is} what I would call a mudstone. No bedding visible. When dry shows tendency to fissility. Contained small elongate masses of iron-oxide probably formerly was marcasite. Saw no fossils.

B - Enemial ls. - 20" of limestone in 3 layers. rather brownish gray in color and quite granular when weathered. Apparent layer has green spots suggesting glauconite. This is all through the ls. From the surface of one large block a well rounded quartzite pebble was taken.

L. menistella
S. murronatus
Atypa - rather small
F. submarginatus
E. fimbriata
R. penelopeae
N. conium
Conocardium

S. sculptilis
P. rana
Schuchertella
P. flabellum
A. decussata
L. periplana
Taeniozora
 A variety of corals.

20" B

Olentangy A.
 16-18'

5.

5.2

20

July 26'

5

1700

61

Marsh's Mills -

A - about 2' above level of river and in base of bank about 100 yds downstream is a layer of fossiliferous lenses 1-2" thick abounding fossils. The lenses are composed of sinoidal ls.

Plat. arkensis

Schuchertella

Cyrtina

Chonetes

Arturocanthos

Tentaculites a

Pan. lirata

P. rana

S. micromatus (very wide)

Melocrinus

One lens has the smooth gray concretion under it. The fossils are also found 4' above lenses - the big Sprifer

A' - is 4" black or brown (weathered) shale below the Encrinur. Styliolina and Leiorhynchus

A² - Calcareous shale about 8" with a marcasite band 6" from base of Encrinur

B - 20" in 3 layers the middle one the thickest

A'

A²

Olenite = 29' in all

A = 27'

lenses

2'

River

62

C = 4' of soft shale abounding in corals. This is the coral zone of the Widdow.

D = 1' of brittle dark, brownish gray ls. weathering to a light ash gray. This ls. is like that of the trilobite beds.

Schuchertella Chonetes
 Simmonea Camerotoechia
 L. laura

E = 5' of fissile dark gray shale crumbling to thick flakes.

C. boothi N. bellistriata
 C. scitulus C. mucronatus

About 3 1/2' above D is a calcareous shale with uncompresssed L. laura

J - 15"

I - 4'

H - 8-10"

G - 5 1/2'

F = 1'

Section continued 1/2 mile downstream

E = 23'

E - 23' fine crumbly, calcareous shale abounding in S. mucronatus, thudfordensis, Chonetes, et al.

D - 1'

F = 1' hard, brittle shaly limestone with dark gray in color with Styrovolina, ostracods, S. mucronatus, Palaeoceras, C. scitulus

G - 5 1/2' of shale same as F
 H - 8-10" shaly limestone like F with Chonetes, L. laura,

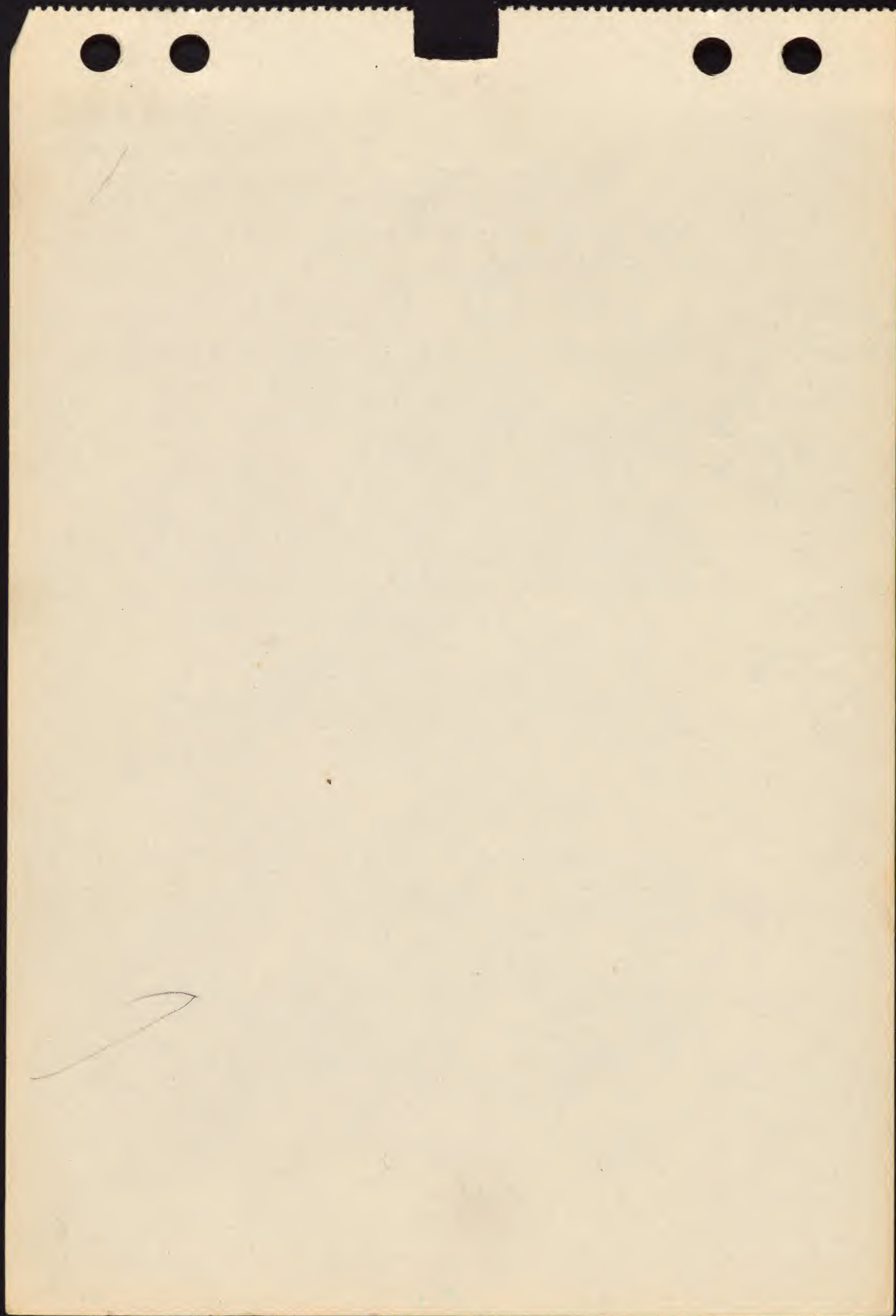
I - 4' shale

J - 15" of hard shaly limestone

63

Dark grey in color with **1702**
 crinoid debris and *Ceratopora* a.
L. laura in great abundance
 and yields good specimens.
 Also *Rhombopora* bryozoans
 are abundant. *S. mucronatus*

The *S. mucronatus* the *thedfordensis*
 are from above the coral zone



Notes on the

Devonian

of

Ontario &

Michigan

1934

July 25, 1934

1696

Section in St. Mary's Cement Co., Ltd.
Quarry - This quarry now takes in
what was the old H. & S. Co. which
is at the NE. side. The following section
is taken at the NW corner. The dip here
is a few degrees to the SW.

A - Light, brownish grey semi-crystalline
massive limestone, very fine-grained
Cyprinodonta, C. mucronatus, small Rhynchonella
Atrypa, S. propinqua, cup coral - 3'2"

B - 2'2" same lithology - Atrypa

C - 1'2" - Same lithology - Chonetes,
Conocardium, small corals, Atrypa,
S. hemisphaerica?

D - 1'4" - Same lithology - Cyrtophylloids with
oil in cavities - small cup corals common

E - 11" same light, brownish grey
limestone. Upper inch or 2 shaly.

F - 8" - Atrypa, Leptæna, Chonetes,
Leptæstrophia in same light brown ls.

G - 11" same lithology - corals, Chonetes,
Atrypa

H - Covered 3 1/2' - Occupied elsewhere by semi-
crystalline and crinoidal limestone in heavy beds.

I - 1'5" - Crinoid debris in upper 2"

Atrypa, Chonetes, Platyceras, same
lithology as below.

J - 10" - same ls. considerable
crinoid debris.

K - 2'2" - Lithologically same as
below. Upper inch shaly.

L - 1'2" - same limestone

M - 1'4" - " " - saw what
looked like a Paracyclas.

N, O - same limestone

Delaware

U - 1'
T - 1'4"
S - 1'2"
R - 11"
Q - 3"
P - 11"
O - 8"
N - 8"
M - 1'4"
L - 1'2"
K - 2'2"
J - 10"
I - 1'5"
H - covered 3 1/2'
G - 11"
F - 8"
E - 11"
D - 1'4"
C - 1'2"
B - 2'2"
A - 3'2"

~~12~~

1 2

1

11

4

1

7

6

38

56

11 44"

4

15'

(2)

P. - 1 inch brown shale with crinoid debris

1697

Q - 3" smooth gray ls. which has lost its semi-xlr character and is much darker in color. S. demissa

R - 11" - dark brownish gray ls. very fine grained not semi-xlr.

S - 1' 2" - 1/2" shale at base - dark brownish grey, fine grained, much oil in stains. Chonetes.

T - 1' 4" - 1/2" ~~shaly ss.~~ sandy shale at base brownish grey but not light in color as below the 1" shale bed. Chonetes, Pholidostrophia, Martinia-like Spinifers (small like Ambocoelia. 2 shale seams, one at base)

U - 1' - Chonetes abundant in same lithology as T.

V - 6 1/2" of dark gray fine grained ls. with Chonetes. S. demissa

W - 7" same crowded with Chonetes and Ambocoelia like brachs.

X - 1' - brownish gray ls with abundance of Chonetes. X' - 4" same X² - 11" same in upper 7" but the lower 4" inches are chocolate colored bituminous shale crowded with Chonetes.

Y - Abounding in Chonetes and large smooth Spinifer - This ls. is dark brown, and rather shaly. The lower 3" is light brownish grey.

Z - same lower 2" brown shale upper part light brown & grey.

32 5 1/2
3' 3 3/8
Z 14"
Y 1'
X ² 1 1/4"
X' 4"
X 1'
W 7"
V 6 1/2"

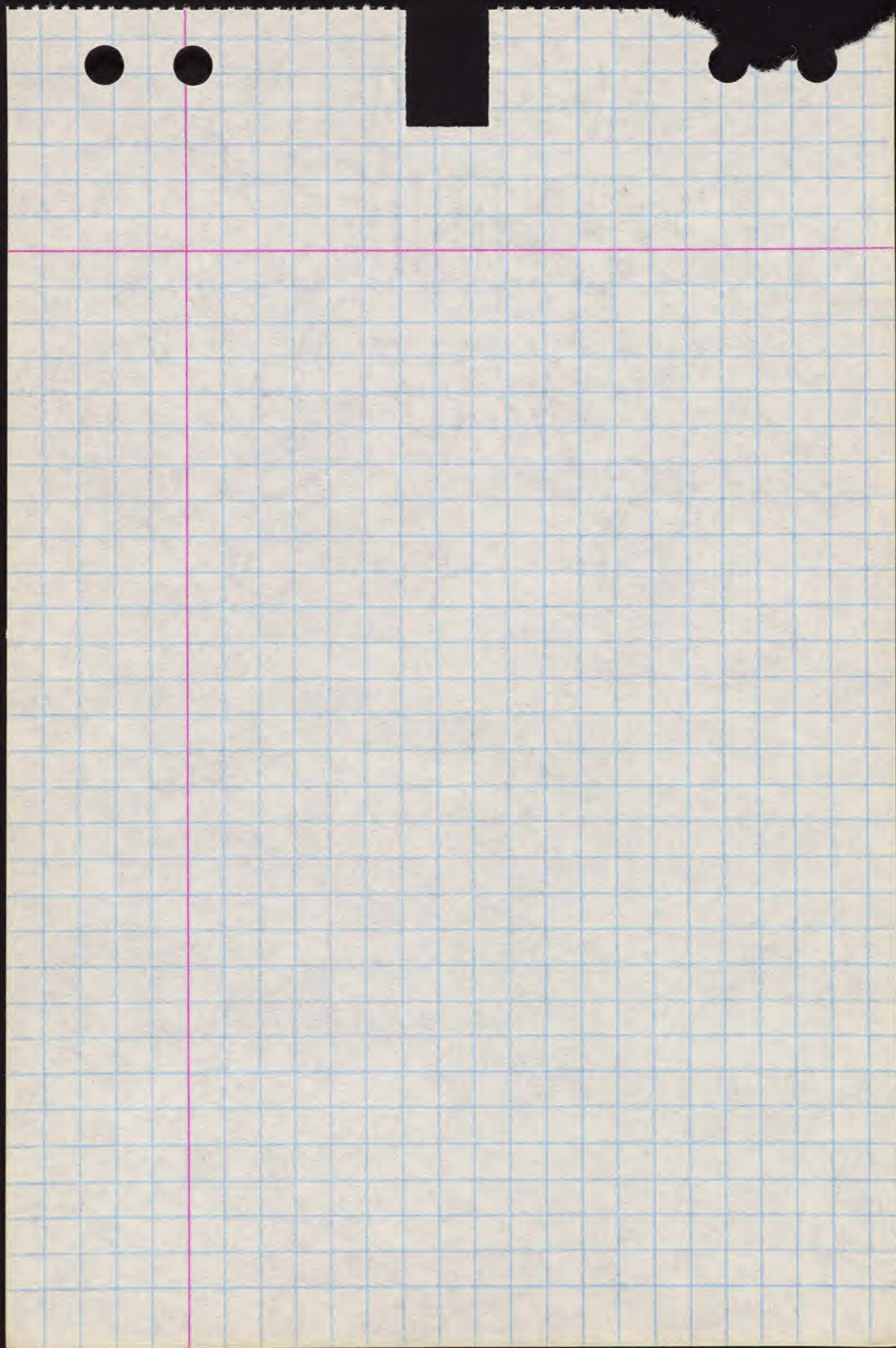
6
3 8
5 '6

1698³

31 - 3' 8" in 4. layers (1'; 1'; 8"; 4" 8")

32 - 5' 2" to top of quarry in rather
shale. ~~limestone~~ ~~about~~ ~~lying~~ in
chondrites. It is light brown in
color. *Pholidostrophia* common

The chocolate shale in X² is the
1/2 foot layer recorded by Stauffer.
The contact of Delaware
Onondaga comes at about my bed
P.



The uppermost ls. suggests the *S. granulosa* bed at 7-mile land.

July 27

8
Stony Pt. 1703
Ontario

From RR station to water level at Stony Point is -93'. Station is 93' above lake. The lowest bed is 6" of hard, blue gray, coarsely granular ls. in it well seen *Trigona* and *T. carinatus*.

The next bed may be solid or split in halves. It is 1' thick. It is coarsely granular with many green specks & greenish gray in color. Large sp., *L. perplana*, *Pholidostrophia*, fine ribbed *Atrypa*. The upper 5" is grayish and has worm tubes. The uppermost bed on the beach is 8" thick and abounds in *Pholidostrophia*, *S. demissa*, flat coral and is the most fossiliferous horizon. This bed is dark gray or greenish gray. Has many worm tubes.

See next page

Fossils seen at Stony Pt. -

<i>S. mucronatus</i>	<i>S. demissa</i> a	3
<i>Atrypa</i> (fine ribbed) 2, 3	<i>S. granulosa</i> n.	2, 3
<i>P. rana</i> 3	<i>P. rana</i>	3
<i>Strophodontia</i> (large) 3	<i>C. boothi</i>	3
<i>S. small</i> (like Michigan) 3	Large <i>Rhipido</i>	2, 3
<i>Elfenopora</i>	<i>T. carinatus</i>	1, 3 or
<i>Fenestella</i>	<i>L. perplana</i> c	1, 3
<i>Atypis fultoniensis</i> 3	<i>Pholidostrophia</i> a	2, 3
<i>Favosites</i> 2	<i>Cystiphyllum</i>	2, 3.

This suggests the limestone
at the 4 and 7 mile dunes.

9
Above the bed 3 are several layers
of ls. some of which appear to be
in place.

1704.

A good deal of our collection
came from loose blocks above
bed 3 but none of these blocks
is far out of place. All of these
have the fauna of beds 3 & 4.
abundant in *Pholidostrophia*. The
weathered upper beds look like
the Menteth but are a little
more granular. A.S.W. thinks these
big blocks are the bed 3 rolled
over or pushed up by the lake.
This would make a total of 30".
The under surfaces of some of
the big blocks show large fossils
looking like *Orthoplycus*.

Petrolia sh - 15" of soft shale
below the ls. have *S. mucronatus*.

Oppenash beach -

10 1705

Anticline of fine-grained blue gray limestone with upper surface containing a great deal of black cherty fossils

C. vicinus a

C. boethi

Cyrtina

S. mucronatus a

S. demissa

L. plana

This rock is lithologically unlike that at Syony Point and undoubtedly overlies it.

1706

July 28

Maitland River 4 miles N of Auburn
granular or semi-cryst.
13 feet of grey buff ls. with corals,
spined *Spirifer*, *Phylloporia*, *Pholidops*
Rhipidomella.

On top of this is 6" dark grey ls. with
P. lirata, change in lithology is striking

Locality 2½ mi N. of Formosa

Detroit River - yellow or buff
dolomite, 3-4' exposed.

Onondaga - Lower surface very
irregular, basal bed gray granular
ls. about 3½" thick - 7" thick. This
is followed by the main mass
consisting of broken corals,
stromatopores, shells and ls.
forming the matrix. It is light
gray in color and checks on
weathering to plates and lumps.
Fossils are often hollow. Many
mineral-filled hollows in the
mass. In lowest 5' conocardium
is abundant.

Fossils -

12

1707

July 28
Goderich

A - Silurian rocks 5' 5"

B - Lowest layer of Onondaga has pebbles and fairly large ones of the Silurian belt. The contact is irregular. The uppermost 2" of the Silurian are rather rotten and weathered. The lower foot of Onondaga is grey, light to dark and granular. It's next 3 1/2' are fine grained granular with small pockets of yellow dolomite x ls. Scattered corals occur here. 2nd step is fine-granular, bituminous shelling ls.

The ls. is quite uniform throughout the mass but on the top of the cliff where I measured it there is a foot of rather smooth, fine-grained dark brownish grey ls. The contrast in lithology is quite striking.

C - Dela.

1'

The Onondaga contains many brown, anastomosing horizontal lines. The Delaware /abounds in a small fine-lined *Atrypa* such as is common in N.W.

B

0
h
0
h
d
a
g
a

32' 6"

Silurian

5' 5" A

River level

July 29 / 13

1708

Section at Rock Glen.

A - Enimul bed is 17 inches

A' - black shale of 2"

A² - shaly ls. 6" & grey, xln ls.

I would call the base of the Enimul at the top of the thin black shale layer. The latter and the shaly ls. below it seem to me to go better with the Odontangy.

B - coral bed here is 2' 8" thick, thinner than elsewhere. It is blue gray calcareous shale abounding in corals etc.

Send Mr. Southworth my Microcyclus. Microcyclus is unknown in coral bed. Eleutherozoon occurs in coral bed.

C - Widdow beds - 18" of brittle shaly limestone very much like some trilobite beds -

C. scitulus

L. laura a.

A. umbonata

Pholidostrophia

D - Calcareous, crumbly dark gray shale weathering light bluish - 15' 3"

C. scitulus

L. laura

S. thedfordensis

C. boothi

S. thedfordensis is abundant near top.

C

E - 1' - 15" of hard shaly ls.

B

brittle passing into the shale below. It contains S. thedfordensis

A

A'

A²

F 8' calcareous sh with a hard band of about 1' thickness at 5' up. S. thedfordensis abundant here.

L. laura unknown in coral bed.

C

D

E

F

G

H

I

J

K

L

M

N

O

P

G - 20" of hard shaly and brittle limestone containing much debris, probably of blastoids. *L. laura* *S. mucronatus*. The fauna we have from the pit just N of the R.R. cut comes from just below this bed. To E. this is the *L. laura* bed.

H - 2' or - The exact thickness was impossible to determine

<i>Ceratopora</i> 2.	<i>Tenestellids</i>
Cinoidal debris	<i>C. indenta</i>
<i>S. thedfordensis</i>	<i>Schuchertella</i>
<i>Oronoceras</i>	<i>Athyris</i>
<i>L. laura</i>	

I - 37" - shaly brittle dark gray ls. with *Ceratopora*.
S. thedfordensis *P. rana*
L. laura *S. denissa*

The *Oronoceras* occurs in bed C

loc

35

July 31.

16

1710

Section at S end of Partridge Pt

A - crinoidal ls. at beach level about 8" - 1' in thickness. They are greenish blue-green in color - lumps containing pockets and partings of shale.
Bryozoa c.

B - covered - 6" - 1'.

C - knobby limestones with shale, fossils abundant - Here is where crinoids, blastoids & corals are abundant about 6" thick. Shale most abundant in lower 3'.

~~D is about 1' thick~~ Corals are scattered thru the mass & of ten upside down or on their side.

2-3' 4'

E

E

1' 10"

D

D - 1' 10" - 2' knobby crinoidal ls. with same fossils as below. but much less shale.

6'

C

6" - 1'

B

8"

A

E - smooth dark grey ls. with very little crinoidal debris resting on D with uneven surface. This has *Hemalocrinus*

*C. boothi**Camarotoechia**Platystrophia*

Below A there is an unknown covered interval then some 6" of shaly ss. and below that crinoidal ls. fossils are not common either. A.S.W. thinks there actually may be no covered interval. This is Verwey's 1 + 2 of p. 188.

Art 17.11

Take of Woods Bay of Kelly Island
Line + Transport Co. NE $\frac{1}{2}$ Sec 33 N, 8 E

Many face 30' high at highest point. Represents beds very near the top, probably within 20' of top. The rock is mostly a dark brownish gray heavy-bedded ls. weathering buff in section but ash gray on the surface. Very bituminous. Fossils are not abundant.

Cystiphyllum

Favosites

Acervularia

Gypichula

Rad. elliptica

A little Bell shale occurs in pockets in the rock.

3 kinds of Atypa

Enompholites

E. larkina?

Rhyticeras?

Aug. 2.

Section at Rockport Bay - 38

Bell shale - This is soft blue, clay shale or mudstone abounding in fossils - Gibbertocrinus, Chonetes cf. coronatus, Camanotocchia aff. hartsfordi or prolifica. Tentaculites, Strophodonts 2 sp. near S. demissa, S. mucronatus like S. m. thedfordensis, Pholidostrophia, Genacocrinus? a.

Rockport ls - Lower 8" is limy shale abounding in fossils -

Athyris

Nucleocrinus

Elytha

Spirifer mucronatus

sp. aff. andaculus

Strophodonts ("demissa")

Atypa-like A. devoniana a

Acervularia c

Stromatopora a

Favosites a

The next 30' of the Rockport are composed of thin bedded ls. with many black shale partings and many large heads of *Stromatopora* *Digitate Favosites* a.

The upper 10-13' are buff, light ls. fine grained with few fossils. See Ver Wiebe's section.

E - 10' of soft calcareous sh with lenses and beds of ls. Very fossiliferous.

C. alpenensis

Attyris c

Atrypa large a

Strophodont *demissa*

Pentamerella large

S. concavatus type

Corals

Pholidostrophia

Acervularia 2 sp. a.

Schuchertella

Sp. mucronatus

Schizophoria

Sp. aff andaculus

G

F=38F

F - Blue gray semi-xls ls. with corals, *Acervularia*, *Pentamerella* (large) *Fenestella* *Sp. mucronatus*

G - 14" blue sh with *Fenestellids*, *Camarotoechia* (small), *Sp. mucronatus*, *Cystina hamiltonensis*, large *Atrypa*. These fossils are in very top of F = *Camarotoechia* zone

H - Hard, heavy bed of grey ls with big *Atrypa* and big *Pentamerella*

I - 8" blue sh with *Schizophoria*, *Atrypa*, *Acervularia*

B=38bJ - same as H

A=38a

K - blue shales with small coarse-bedded *Strophodont*. *Stromatopora* is rare above C in the Rockport ls. The Bell suggests *Olmutang* by position but the fossils seem to be quite unlike

L = 6" ls. seen in 1936 & 37

34" 6" 1"

3 1/2'

2"

2'

14"

2 1/2'

10'

38E

10-13'

38C+D

38C+D

27'

Ver Wiebe section

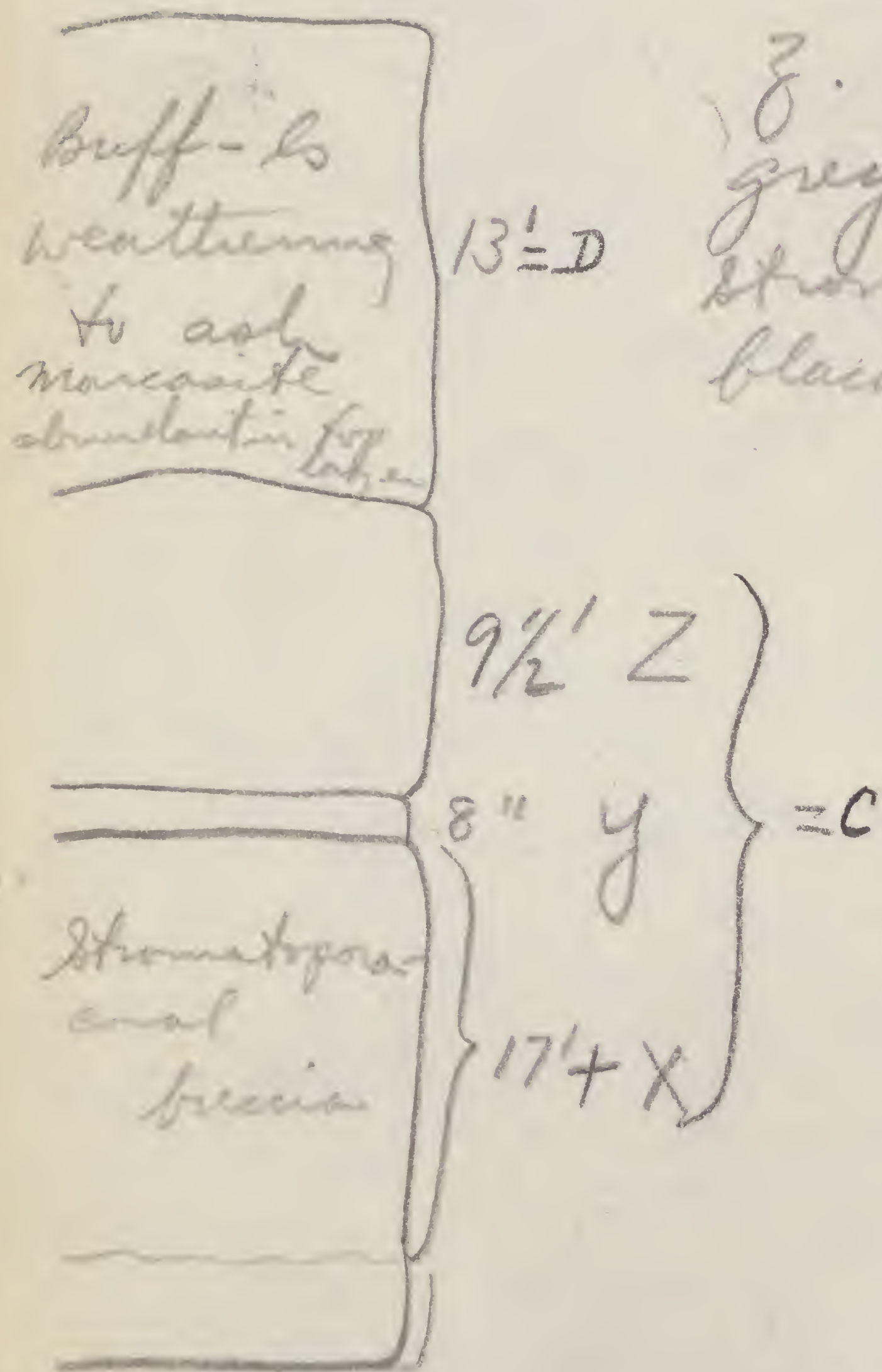
Bell sh.

over

Rockport ls. (C+D of previous section)

X - Dark brown grey ls. largely composed of fragmented *Stromatopora* + corals. Thin irregular black sh seams wrap around corals + *Stromatopora*

Y - 8" black sh with large *Aceroularia*



Z. Black or dark brown grey ls. with very few *Stromatopora* + corals. Much black shale in thin seams.

Aug 2'

Along quarry R.R. 4 mi. N of the Rockport Ay is a small outcrop of Bell shale with *Aceroularia*, bryozoa,

1713

19 Aug. 3
Petkeys Pt.

Loc 39

About 2' of uppermost Dundee
brunglet ruffish an anticline.
This is $\frac{1}{4}$ - $\frac{1}{2}$ mile north on the shore
of the crusher of the Rockport Qy.
The rock is brittle brown grey ls.
with a little granular or ~~crinoidal~~
crinoidal ls of a lighter. Fossils

Schizophoria

Cystophylloids

6 smalls

Stromatopores.

Spiner

Atropa

S. denissae.

Aug. 4 51

Abandoned Qy of Alpena Portland
Cement Co, SE $\frac{1}{4}$ Sec 18, T 32 N, R. 9 E
Middle Long Lake

A- 2-3' of greenish blue shale with
abundant brachiopods, small Cyrtina,
Schizophoria, big Pentamerella, & S. denissae,
Pachystrophia S. mucronatus

The upper few inches are in platy
semi-crinoidal ls. with some fossils.
The lower part of shale acervularia
and a few other corals are present.

B- soft shale with thin layers or
lenses of shell breccia. In the
shale C. aff. coronatus is very
abundant. Together with S. denissae
& S. mucronatus. In the ls. occur
large Spiner, Cyrtina, Aviculapecten
S. mucronatus.

S 30 W

40' per mile

36-

Regional dip

20

1714

C - one foot of limestone - earthy gray color semi-granular

D - 7 1/2' of shale, mostly covered, got no fossils from it.

4 1/2' G

7' F

15" E

7 1/2' D

E - 15" of limestone, dirty gray with large *Spiner*, large *Atrypa*

1" C

14' }
24' ± B

F - 7' of shale and thin beds of ls. alternating -

H. ramingari
Big *Schizophoria*
Big *Spiner* (granular)

Pholidostrophia
Huge *Atrypa*
Productella

3' ± A

G - 4 1/2' of limestone, heavy-bedded with basal bed of two feet separated from

upper bed by 1 foot of shale

The lower part of the section
to D has very few *Atrypas* but
the upper part has them in
abundance. This section is
stratigraphically not far above
the top of the Rockport Qy.

v1

Aug 5

18 32 3

1715

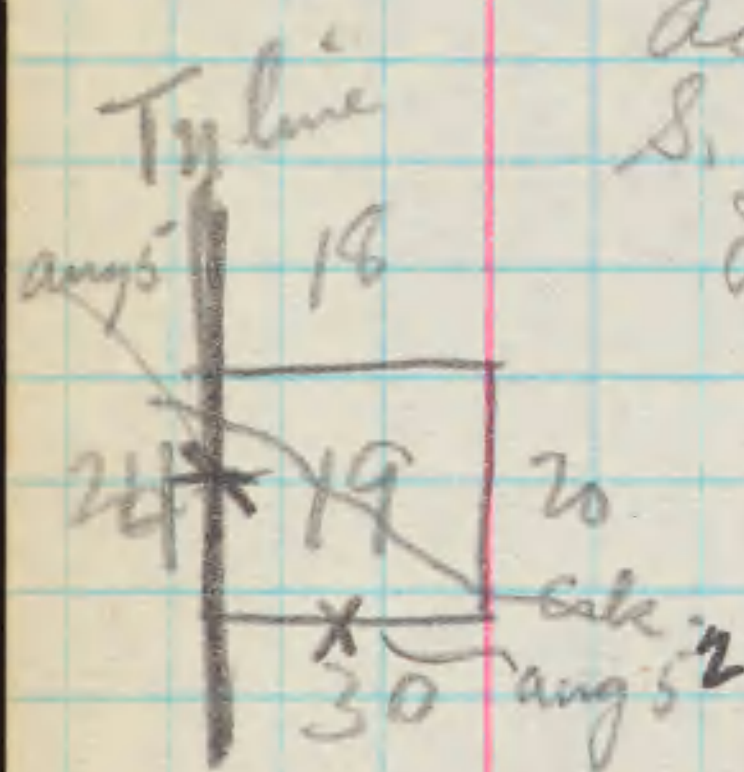
Aug. 5 - NW corner sect. 19, 32 N, 9 E.
about .2 mile S of Long Lake Creek
(Hell Creek). 2 thin grey ls. now - x
ls. corresponding to bed G of the
Alpena Portland Cement Co. Qy.
These beds were seen along the
road just east of the Genshant
school to the next section line E.
This section is between sections 19
and 24.

Aug 5^o 0.2 mile still farther south is a third
thin ls. which is quite crinoidal this
differing from the two below. These ls.
hold up a high ridge and flat.

Aug 5^a This thin ls. is well exposed .4 miles
east of the section line. Here fossils are
common. The ls. is about 2' thick.

Productella	Platystrophia
D. romingeri	Pterinea
Big Atrypa	big Spirifer
Acervularia	favosites
S. demissa	

This bed is 5-10' above G.



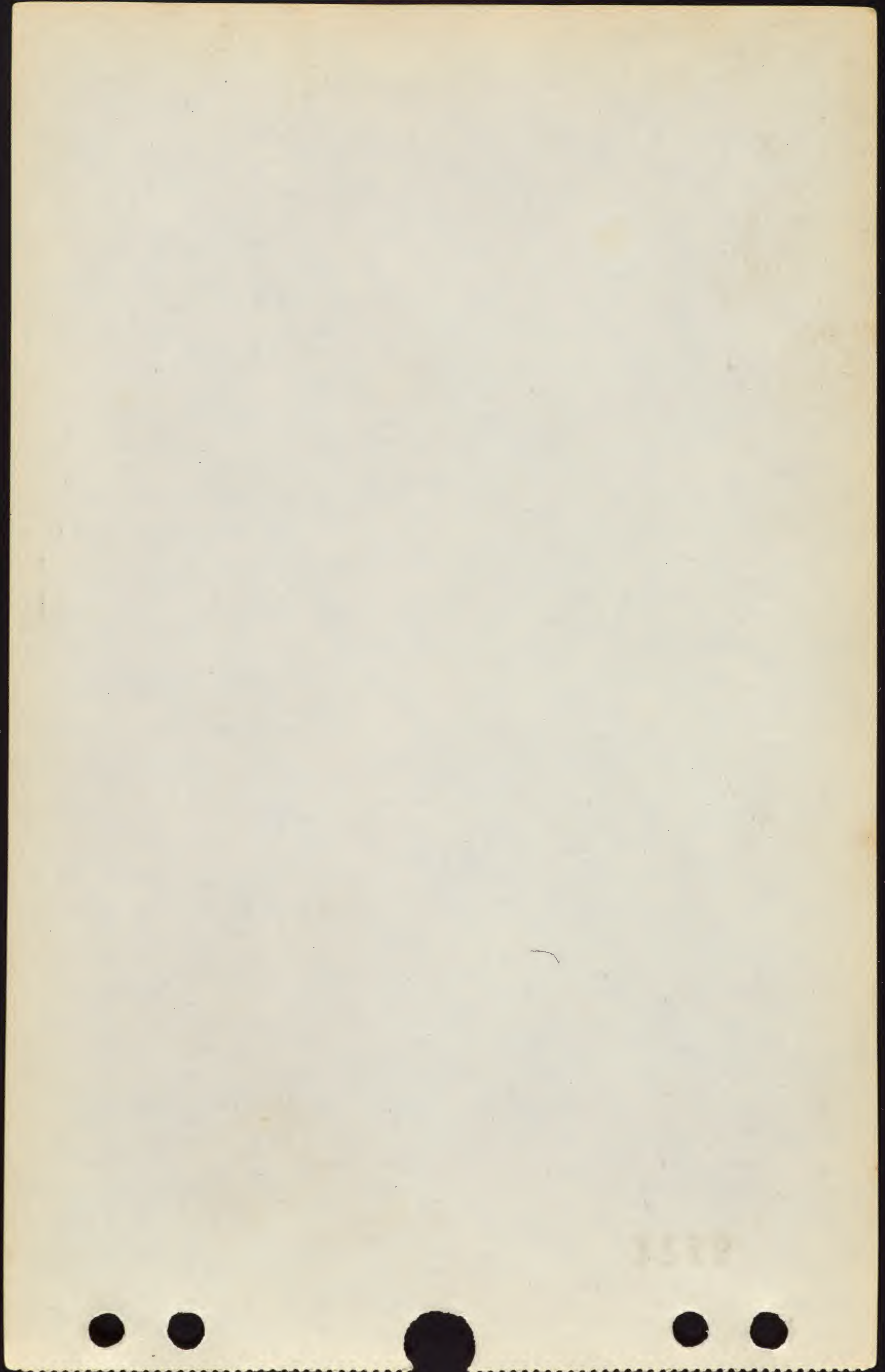
SW corner SE 1/4

Aug 5² - Sec 30 32 N, 9 E - 1 foot +
of pinkish crinoidal ls. with
S. murmuratus, big Spirifer, big
Atrypa + big Atrypa. This must
be about 20' above Aug 5¹ ls.
Big Spirifer has no furrow in fold.

This is uppermost
Genshant

Aug 5³ 0.85 mi. E on same road
(SE cor. SW 1/4) about 3' crinoidal ls.
Sec 29, 32 N, 9 E. Contains abundant
Stromatopora + Acervularia.
This is the upper x ls. above
the 2 ls. The distance between the

This is
apparently
OK



✓✓

1716

Center of rect. line sec 25

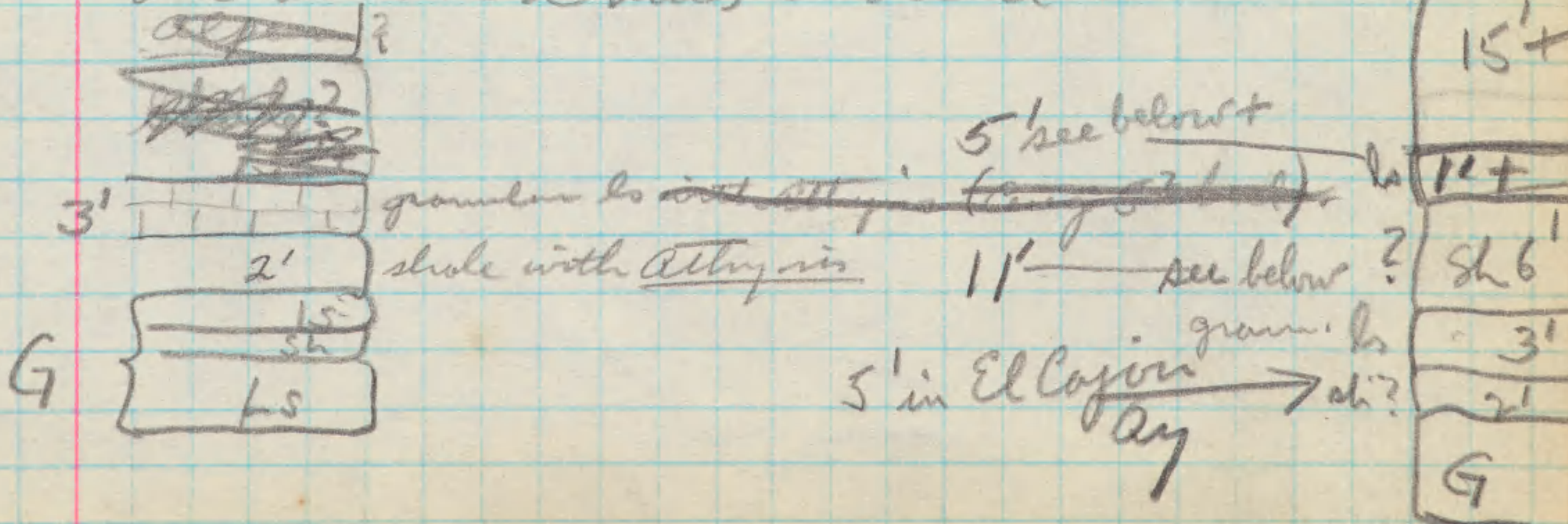
~~32 N, 8 E~~

will. Quincy spoke

SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec 23, 32N, 8E

Aug 5th - Under bridge over Long Lake
Creek on Long Lake rd. - 15' of ls +
shaly ls dipping E about 10°. At
top ~~of these~~ at old dam are large
Orthis, Orthis, small Strophodontia
which belong at top of section
(probably). This sequence probably
fits with semi xlr. ls. above (2') above
G bed of A. P. C. Co. Ar. The Orthis
bearing shale probably fits between
the upper G bed & the 1 xlr. ls. Black
Alameda

The section thus would be



v3

Aug 57 - Along Alpena - Long Lake Road about 13 1/2 mi. N of Town Hall base of black Alpena. Along west line of NW 1/4 sec. 26, 32 N, 8 E about 1/5 mi. S of N line of section. (1 1/5 mi. S of NW corner to be more precise. (Killians)

A58 - patch of upper Long Lake in rd. and on E side road in dirt are silicified *Orthis*, *Cyrtina*, *S. demissa* small. This is same as upper beds at A56.

A59 - 15' - above A58 is exposure of black Alpena, probably the base. There are 21' of this black ls.

A510 - Rather dark gray, semi-crinoidal ls. weathering brown but along bedding

<i>C. coronatus</i>	<i>S. mucronatus</i>
<i>Pholidostrophia</i>	<i>Pterinea</i>
Large <i>Spirifer</i>	No <i>Orthis</i>

This is typical Alpena and is clearly the basal layer. *C. coronatus* was seen in Alpena just above the Killians on the Long Lake road.

v 30.

Aug 6¹

1718

NE corner SW 1/2 sec 15, 32 N, 8 E.

on shore of lake, poor exposure showing 2' ls., then 8" shale followed by about 1" ls. all with *Athyris*. about 0.1 mile S on W side road is small exposure of granular ls. with *D. romingeri*, *D. mucronatus*, & large *Athyris*. This section is thought to be about the same as at El Cajon. The thickness of the granular ls. must be about 3'. The granular ls. dips N toward the lake.

Aug 6²

0.3 miles S of Aug 6¹ - same granular ls. also capped bed at A 6¹, here it is nearly flat forming the crest of a gentle dome.

Aug 6³

Center NE 1/4 Sec 22, 32 N, 8 E.

A - on a small gully and along S side of road in ditch. - Our lower granular or top of El Cajon section is exposed in gully, 3' dips N.

C - 5'

B - 11"

A - 3'

B - Shaly calcareous bed with *D. romingeri*, *Quinotophyllum* (type loc.), in lower 2'. Higher comes *Schuchertella*, big *Schizophoria*, big *Spirifer*, *Athyris*, *Cyrtina*.

C - dark, gray fine grained ls. with big silicified *Athyris*, *D. mucronatus*, *Acronaria*, *Pholidops*, *Athyris*, *Productella*, big *Spirifer*, *Cyrtina*.

24

Aug 64

1719

About 1/2 mi N of Alpena - Long Lake road intersection with one to Long Lake Lodge - outcrops of same bed as C at A63.

Aug 65

Rabbitan
Farm

0.85 mi. N of Presque Isles - Alpena Co. line on road to Rockport just N of sec 2, T32N, 8E. 4' calcareous shale with a 6" limy bed. *B. romingeri* C, big *Atrypa*, big *Spinifer*, *Pterinea*, *S. demissa* (7 kinds), big *Schizophoria*, *Athyris*, *Cyrtina*, small encrinurals.

Suggests bed F of APC co. On this road exposures of Rabbitan Farm of Orabon.

Aug 66

Sec A63 + A64 - On sec. line 0.1 mi. S of NW corner sec 25, 32N, 8E.

Crinoidal ls. poorly exposed in ditch with *Adenulidina* + *Stromatopora* - basal Summerville ls.

A67

0.2 mile S. of A66 about 1-2' of dark gray ls. with large *Gypidula*, *Cyrt. alpenensis*, large *Atrypa*, *S. mucronatus*. This is uppermost Summerville.

A68 -

Base of black Alpena (Killians ls.)

Aug 7.

1720

25

Recheck on section 5 of Long Lake Lodge

Sect $\frac{3}{4}$ mi

S of Long Lake Lodge

but with *Cyt. alpenensis* in the zone top.

bottom bed

9' \pm ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

ls

C - This bed is gray ls. abounding in large *Styria* in the lower part but with *Cyt. alpenensis* in the zone top. *Stromatopora* and *Acrotreta* are in the lower part. The top of C. is about 10' below the black Alpena ls.

C The B. beds most certainly are the 5' interval at the top of the El Cajon Quarry. I am not sure if A belongs to our B. or to what we called the "lower granular". The *Cyt. alpenensis* zone here is equivalent to the C. alp. zone on the Wessel road where lower ls it is 10' below black Alpena

The two beds at the Long Lake Lodge may belong actually to our 3' of ls below the bridge or the A of the section $\frac{3}{4}$ mi. S of Long Lake Lodge, and may be equivalent to the lower beds at El Cajon or the upper ones at A P. Cay. The lowest beds at Long Lake Lodge are 3' above Lake level.

Section at Long Lake Lodge

ls

same as c above

covered ?

ls

ls with *atrypa*

covered sh

2'

ls

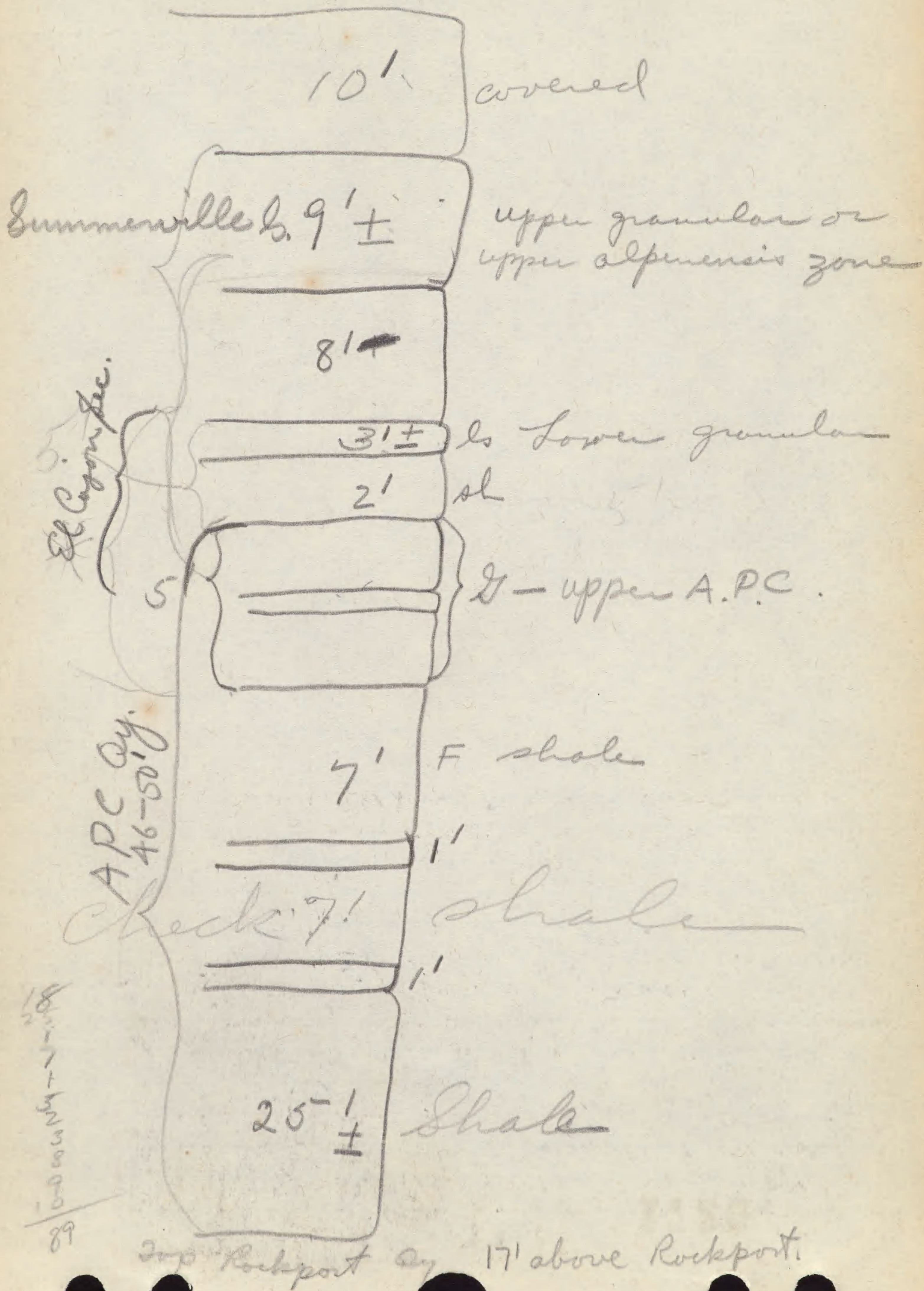
2' with

ls

2'

This is thought to be our lower granular. This is probably A of the above sect. This would be upper B.

Long Lake Series



76

At Killians Co. 8 mi S. of intersection
 the Alpenensis was seen (broad
 and ~~flat~~ with our ls. 9' thick
 this would put the ls. about
 6-8' below the black Alpena. This
 is more in keeping with the
 Wesel road section where my
 10' between the two is certainly
 excessive. There 8' is about right.

A7'

Basal, Summerville ls. with
 Stromatopora & Acervularia

1722

A 72

27

Fletcher or Boony Co. dam.
Norway Point Dam

Section on N side of river - here
heavy bedded ls. are brought out
of the river by an anticline, possibly
a reef below.

A - heavy bedded rather light
brownish gray ls. abounding in
fossils -

Pholids a

Camatoechia c

Cyrtina

S. granulosa

S. demissa c

C. coronatus

Stroph. concava.

S. mucronatus

B - 1' nodular, irregularly bedded
calcareous(?) sandstone of very fine
grain. The irregular nodules are
calcareous.

C - shaly sandy shale with thin
calcareous nodular beds, fossils
rare -

Small Cyrtina

Pterinea (Cornellites)

S. granulosa

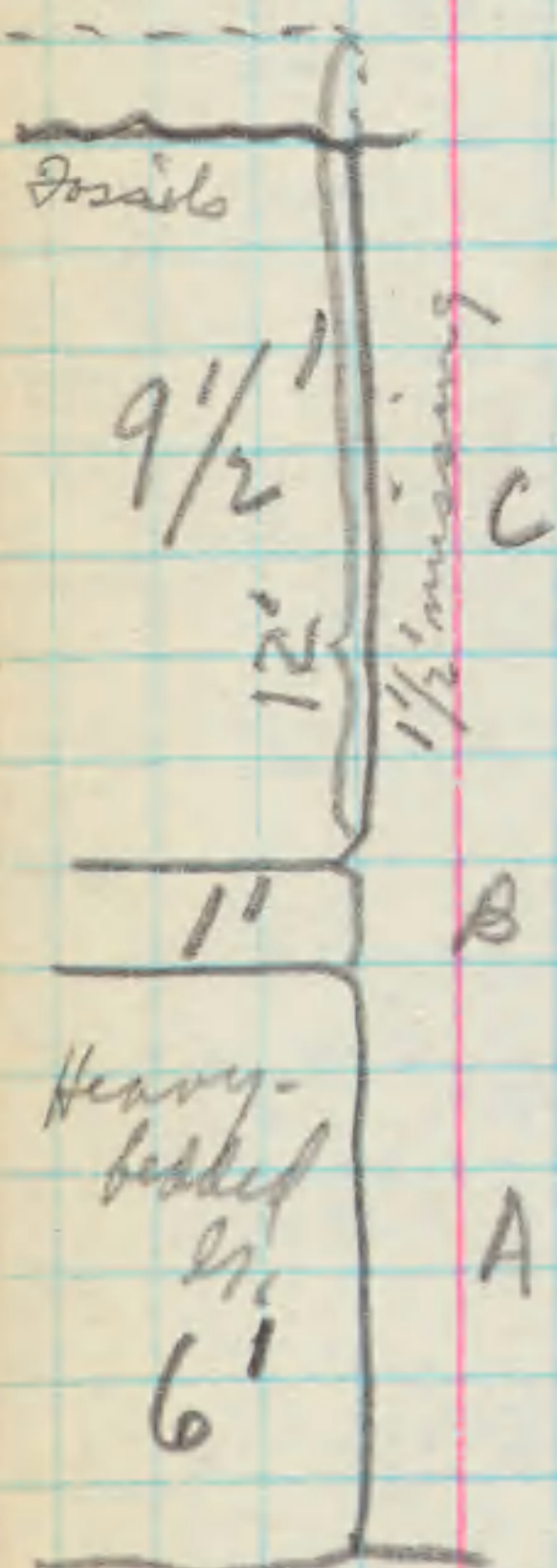
Chonetes coronatus

Small fine-lined Arthropods

Arthropods at base

Fish

S. demissa



The heavy blocks of C have - Arthro-
pods-like markings & rain-drop
impressions

28

A7² cont'd

Section on S side 1723

Thunder Bay River at Fletcher dam. or Norway Point dam

47

A - shaly nodular ls abounding in fossils:

Cyrtina 3 sp
S. demissa (fine)
Pentamerella small
Cyphæus a
Phacops
Small Utupia

S. granulosa a
C. crenistriata
C. coronatus ~,
Bryozoa
P. flabellum

These beds suggest the Plurodictyum zone of Lake Erie

3'
8' +

Layer B - soft shale nearly barren of macrofossils.

10'

B C - grey siltstone or fine sandstone with
P. aff. constriata O. undulata
H. deKayi ?

2 1/2'

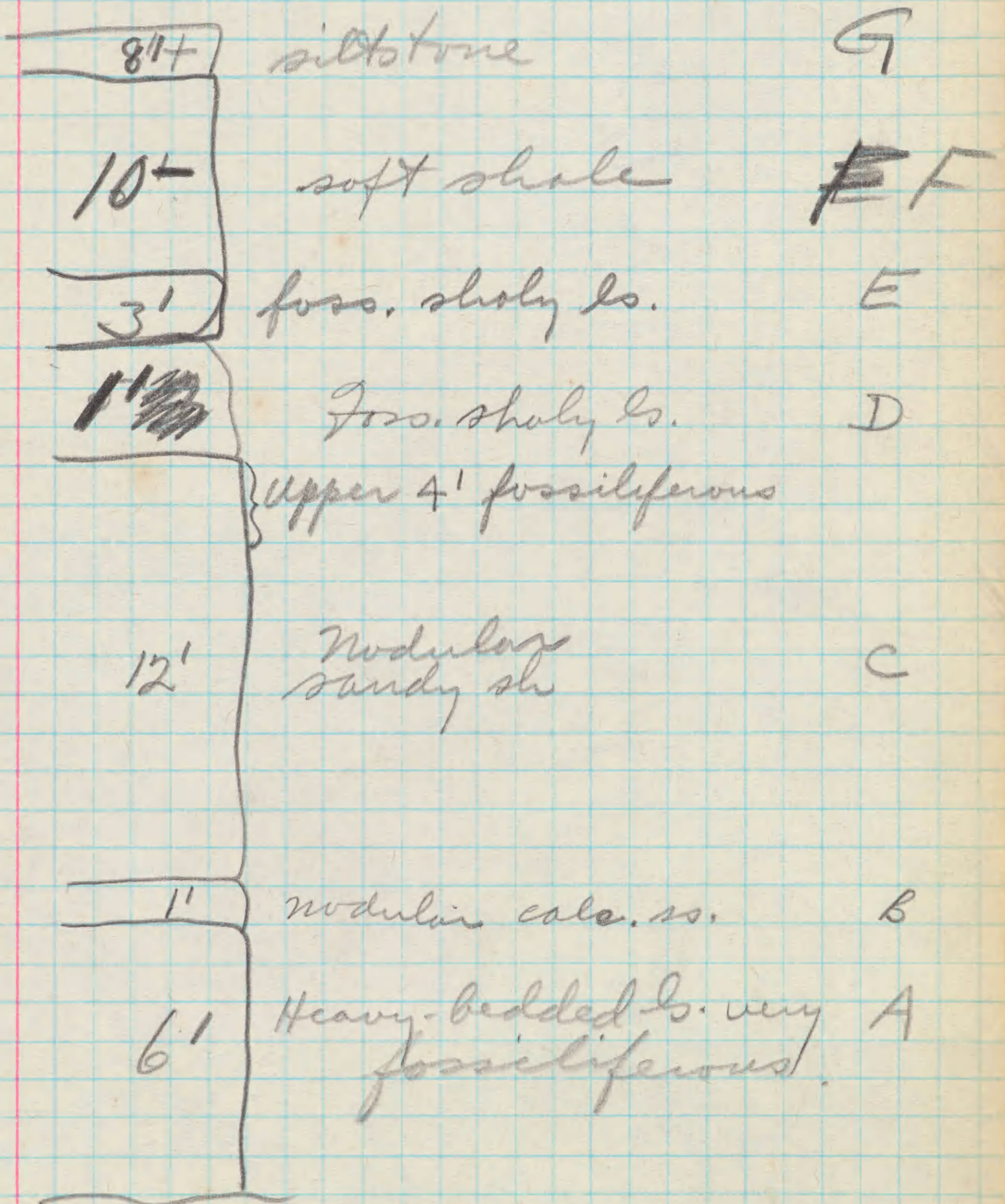
A = D -

The beds on the south side of the river are nearly flat but the ones in the anticline dip steeply.

According to A.S.W. there are 12' of the C beds on the N side of the River & above this 3' of fossiliferous shaly ls. with ^{shaly ls. conoidal to} ~~shaly ls.~~ comes the section of the south side of the river.

1724

29

Composite section at
Fletcher Dam

The rocks here are strongly
folded dipping 30° from the dam
where we measured them

A73

1725

Section at 4-mile Dam

141
30Section made at 5 4/3 of
dam running 520 E -

6' + F soft blue shale

2' E - sandy, grey limestone with
sp. micronatus.3' D Soft blue ^{clay} shale - basal 6"
with sp. granulosa, & Cyrtina

1' C. - Rather hard sandy ls with Cyrtina

Noddy sand, calcareous shale
with Cyrtina, Cyrtina, Bygonia
fine ribbed Atrypa, Pterocops in
lower 2'.9' B This bed may correlate with
C of Fletcher dam, but I doubt
it.Massive reef ls. with large
coral heads, Atrypa, crinoid debris

7 1/2' A

Note - At first we thought C
belonged to upper C of dam. No west
These rocks dip S 60 E strongly
when we measured them

31

Aug 8
SE 1/4 Sec 019, 31N, 8E.

1726

Loc
37

series of thin ^{impure dark} limestone beds separated by thicker layers of shale all totaling about 4-5'. Large heads of Favosites & Stromatopora are abundant. Also Corocardinium (like emmetensis), small Atthyris & small S. demissa. Near top of Shumlers Bay 20-25' below Partridge Pt. beds.

Aug. 8¹

1/2 mile east of Aug 8. 2' of impure irregularly bedded dark gray ls. with Cylinthophyllum, Favosites, Atypa, small Atthyris.

Aug 8²

SE 1/4 Sec 25, 31N, 8E.

Potter farm - starting at city limits on Hwy 2348. And going W on Highway A - in ditch calcareous nodular silty rock for 1' followed by hard irregularly bedded dark gray ls. weathering brown (B). Actually bed A is a composite of about 6" limestone, then 6" shaly rock where fossils are common.

Club-shaped Stromatopora, Favosites, cup corals, Stuartella, Cyrtina alpenensis, small S. demissa (coarse-jointed), also Corocardinium.

B - is 2' of limestone which dips 2-3° east. hence in brand-leveling we go up dip, at least for a time.

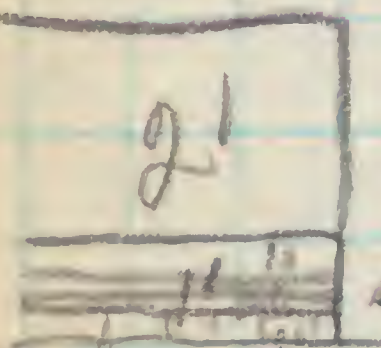
1st HL = 68 paces. 2HL = 34 paces

At the top of 2HL, is about 1' of gray ls. in the ditch which I take to be the same as B. It has Stromatopora and corals.

3HL = 40 paces and this comes at the crest of the first rise. This exposure extends for 60 paces beyond 3HL to the west.

Probably 3' here

Section at
city line



3V

At the middle of the exposure there is a dip of about $1\frac{1}{2}^{\circ}$ to the SE. At the W. end of the exposure the dip is $1\frac{1}{2}^{\circ}$ to the west. The crest of the rise is about 50 paces west of 3 H.L. Then the west limb of the anticline descends under the next rise. 4 H.L. = 168 paces. From 60 - 168 is covered and down covered dip slope of B.

5 H.L. = 104 paces - all covered

6 H.L. = 55 " " " " - at

~~7 H.L.~~ = top 1' limestone poorly exposed with digitate favosites

7 H.L. - 32 paces - base forms a low bench at top of 6 H.L. - ls. poorly exposed on slope of terrace formed by 7 H.L.

8 H.L. - 62 paces - top exposes 2' of limestone

9 H.L. - 50 paces - this is very top of high terrace and from here westward there is a long gentle west slope for $\frac{1}{2}$ mile or more. The top of 8 H.L. is flat ls. crowded with broken corals but as one rises to the top of 9 H.L. the dip apparently steepens to the east so that one walks up the slope of the 8 H.L. bed. I therefore doubt if there can be more than 25' of ls. exposed between 3 H.L. + 9 H.L. if that much.

From top of 6 H.L. to 9 H.L. there is continuous ls. but from 3 H.L. to 6 H.L. it is mostly covered. Perhaps this is a shale interval.

In the field N of the road about $\frac{1}{3}$ the distance between 3 H.L. and 6 H.L. is a patch of the B. ls. which undulates. This certainly restricts the thickness of the B. ls. that above B. to probably about 10' and there is very likely little shale there. The fossils at the city limit come from shale

partings in the lower ls.

1728

33

Aug 8³

Qy in NE $\frac{1}{4}$ sec 29, R 31 N, 7 E. S of
Detroit + Mackinac RR.

36

8 $\frac{1}{2}$ ' of light gray ls. fine grained
or somewhat. In SE corner of Qy
upper 2' dolomitized. Fossils rare
1 large Stromatopora 4' by 2' high.
Small weathered digitate favosites
Eumyrioloids and a large high-
spined snail common in middle
of Qy.

The Warner brick yard is no
longer available for collecting. 3rd
St. SW corner Alpena. Filled with
trash and overgrown by weeds.

Aug 8⁴

Stony Pt. - Alpena Tourist Park

20" of dark gray, fine grained limestone
in 2 beds, the lower 1 about 11" thick
Fossils not rare, Atrypa, small cup coral,
small digitate favosites.

34

Section at El Cajon Beach

49

1729

A - Probably ~~type~~ of my B. beds of A.P.C. Bay.

B. Buzza, Productella, large Schizophoria, Pterinea, Pholops, Pholidostrophia

C. Productella c. S. mucronatus, Pterinea, big Atrypa, Somophora, Pholidostrophia, Schizophoria, Small S. denissae, Proetus. Top B. bed.

semi 8" granular

E 8"

5' Calc. sh

D

D - Schizophoria, G. romingeri, S. mucronatus, big Spirifer, big Atrypa (rare), Pholidostrophia, Productella, Cyrtina no. sp., Phacops, Atrypis.

2' Shaly ls.

C

E - probably our lower granular - Big Atrypa, Pholidostrophia, G. romingeri, cup corals, Sp. mucronatus, small S. denissae, Cyrtina, Productella.

11" shale

B

6"

A

$$\begin{array}{r}
 450 \\
 \underline{2} \\
 900 \\
 \underline{150} \\
 1050' \\
 16''
 \end{array}$$

30' per mile

1400

1150

35

Aug 10.

Partridge Point —

1730

to small Pt.

Dip on P.P. beds
is about 30' per mile.

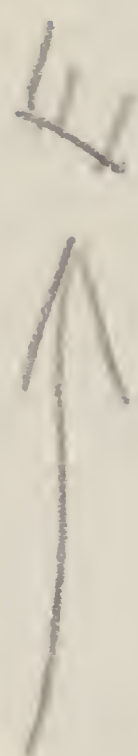
Southeast along strike of rocks 200 paces from southern or SE. end of Partridge Pt exposure is on basal limestones of the P.P. exposure. Then go about due south ⁴⁵⁰ paces which is a ~~little~~ oblique to the dip to the body of a narrow point which carries the upper blastoid beds.

100 paces ~~to the~~ SE to the tip of the point. This point produced about due SE would bisect Sulphur Island. The strike of the beds on the tip of this point would run through the S end of Sulphur Island but they appear to plunge under the island. There are upper blue dense ls.

Going SW directly down dip 107 paces brings the Goniolite beds dolomite blocks 6" thick appear scattered about. At 212 paces they are definitely in place. At about 600 paces the ~~thick~~ blocks of dolomite disappear and smaller slabs with goniolite appear. The inlet just S. of the fast point has a low elevation made up of the thick dolomites which range from 6" to 1' in thickness. Since the point is made up of upper P.P. there could be (with dip of 30' per mile) about 6' of beds between upper P.P. and the Goniolite bed. But there are at least 2' of upper P.P. which make about 4' between upper P.P. and goniolite.

The Goniolite bed is exposed

From Pt
with contact
of P.P. &
upper P.P.



SI



36

for fully $\frac{1}{2}$ mile w on the beach. Apparently 1' or less of dolomite comes in on top of the Goniatite bed. On the beach the bed (Goniatite) appears to be flat. I suspect the Goniatite bed is very close under the black shale.

Handbook of Bryozoa for Andrew McWain

There should be unconformity between upper dolomite and upper P.P. beds. However contact was not seen.

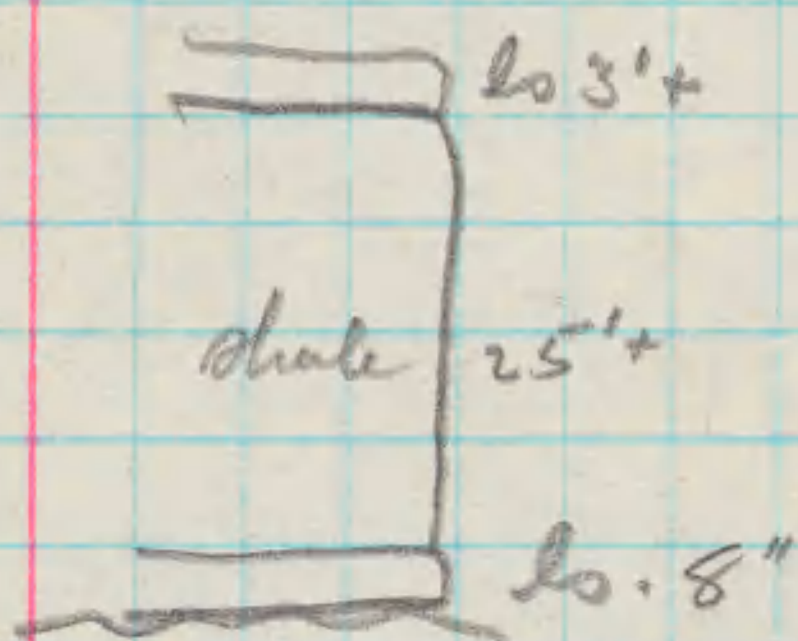
Aug 11.

1732

37

Fossils seen in top of lowest
self bed at Fletcher dam are
Pentamerella small fine-lined *Atrypa*
S. mucronatus *Camarotoechia*
Cyrt. alpenensis *S. granulosa*

Loc 46 Section on Thunder Bay R
about $\frac{3}{4}$ mile downstream from
Fletcher dam - Above 8" of limestone
thought to be the uppermost one
under the clay at the dam
comes 25' + of blue shale
with *Chonetes*, *S. demissa*,
S. granulosa, *Cyrtina* 2 sp.,
S. mucronatus. This is
thought to be the same as
the uppermost shale at
the Fletcher dam.



1733

Loc 40 Alpena Limestone in quarry
of Michigan Alkali Co.

38

At the base of the quarry are about 10-12' of dark gray to greenish abundant in fossils, mostly corals and *Stromatopora*. Some of the beds are quite thin. Here were seen:

Small *Conocardium**Acervularia**Strophomena**Favosites**Sclerophoria* (small)*Botryllus socialis*

Above this is a bed of dark petroliferous limestone containing *Calymene*. This is 20 feet thick.

At the ledge of the first level in the quarry below the top are 3' of shale abundant in *Atrypa*, *Spirifer*, etc. This is about 30 or 35 feet below the top of the quarry.

Some 15-20' below the top there is an abundance of white siliceous material.

At the top of the quarry there are 2' + of blue shale like that at the Thunder Bay Q. This very likely corresponds to the top of the latter quarry.

At Thunder Bay Q there are 8' of blue fossiliferous shale about the top of the quarry copped by about 8' of limestone.

Top Killians exposure roughly 39' over lake

Aug. 13. Loc

1734

Upper Dundee with large
andils, Acervularia, Alveolites
Favosites, Phillisostrea

Aug. 14 -

Section at Killians

Above the Summerville ls. there are
(B) - 7 feet of dark, calcareous shale
abounding in fossils: - *Cyrt. alpenensis*,
Dypidula sp. *winingeri*, *S. aff. demissa*,
S. mucronatus (large), large *Athyris*,
wide-linged *Productella*, large *Atrypa*

C - On top of the shale is a layer of
dark gray ls. 8" to 1" thick containing
fossils like those in B. below it -
Here the large *Dypidula* is very
abundant together with *S. mucronatus*,
large *Atrypa*. The large *Dypidula*
is very abundant at the very
top where black shale appears

Black
Killians

D
limestone

C
very dark
B
gray shale
Summerville
A
ville ls.

20'±

1"

7'

10'±

Killians ls (D) - black shaly ls.
containing fossils. Big *Symphonaria*,
Dentalium, Small *Strophodont* *eratica*
very abundant, Big *Athyris*, big sp.
mucronatus, unidentified clams.
Many small *Favosites* (club-shaped and
digitate), ~~some~~ large *Stomatopora*, and
an occasional *Acervularia*.
I think this is the black bed near
the base of the Alpena Quarry.



1735

40.

The reef of Ulrich is a low anticline (sharp) extending due south. About east of the road exposure of Killian ls. this anticline widens, the beds separating and crossing the road at intervals. The Killian makes a steep bluff facing Long Lake. Under this bluff the anticline plunges under the bluff.

42

Aug. 15 -

1736

cln N branch of Thunder Bay
river about two feet of
gray fine-grained ls. abounding
in *Rhynchonella* aff. *coronatus*.
Other fossils were *Platyceras*,
Pholidostrophia, *S. dentata*.

This suggests the same beds as found
on the arch at Norway Point dam.

Aug 16 -

1737

53

Section along S road from
4 mile dam. -

28.65

A¹⁶

A - From a point about 0.1 mile
south of bend in road at dam
and for 0.2 mi. beyond (S) of this
point rock is exposed along the
roadside. At the bottom it is
coarse crinoidal ls. but at the top
of a low rise opposite first house
on west side of road the rock is
rather dark gray, smooth ls.
Fossils are common in all parts -
In the lower part were seen *S. granulosus*,
small *Atrypa*, small *S. demissa*, small
Athyris, *Pholidostrophia*. Higher were
seen *Dolabocrinus*, small *Pentamerella*,
C. cornutus, medium sized
Strophodontia. This is the ls.
above the shale visited on Sunday
Aug. 12.

A^{16a}

B - 0.1 mile further south in ditch
and exposed for about 50 yards is
dark grey ls. with Favosites, *Cystiphylla*,
cylindrical corals, digitate Favosites
Stromatopora (large), fairly large
S. demissa, corals are the most
abundant fossils, with *Stromatopora*
next.

A^{16b}

C - 0.7 mile further south of last point
dark gray fine-grained limestone
with large *Stromatopora*, Favosites,
Atrypa, small *Athyris*. The *Stromas* are
gigantic

29.75

D - The main road came at 30.65 and
a little ($\frac{1}{8}$) mile to the east comes the
Corocardinum - *Stromatopora* locality.
What we have come through here
is essentially the Patter farm
section.

424

Aug 16'

1738

32.55-
33.15

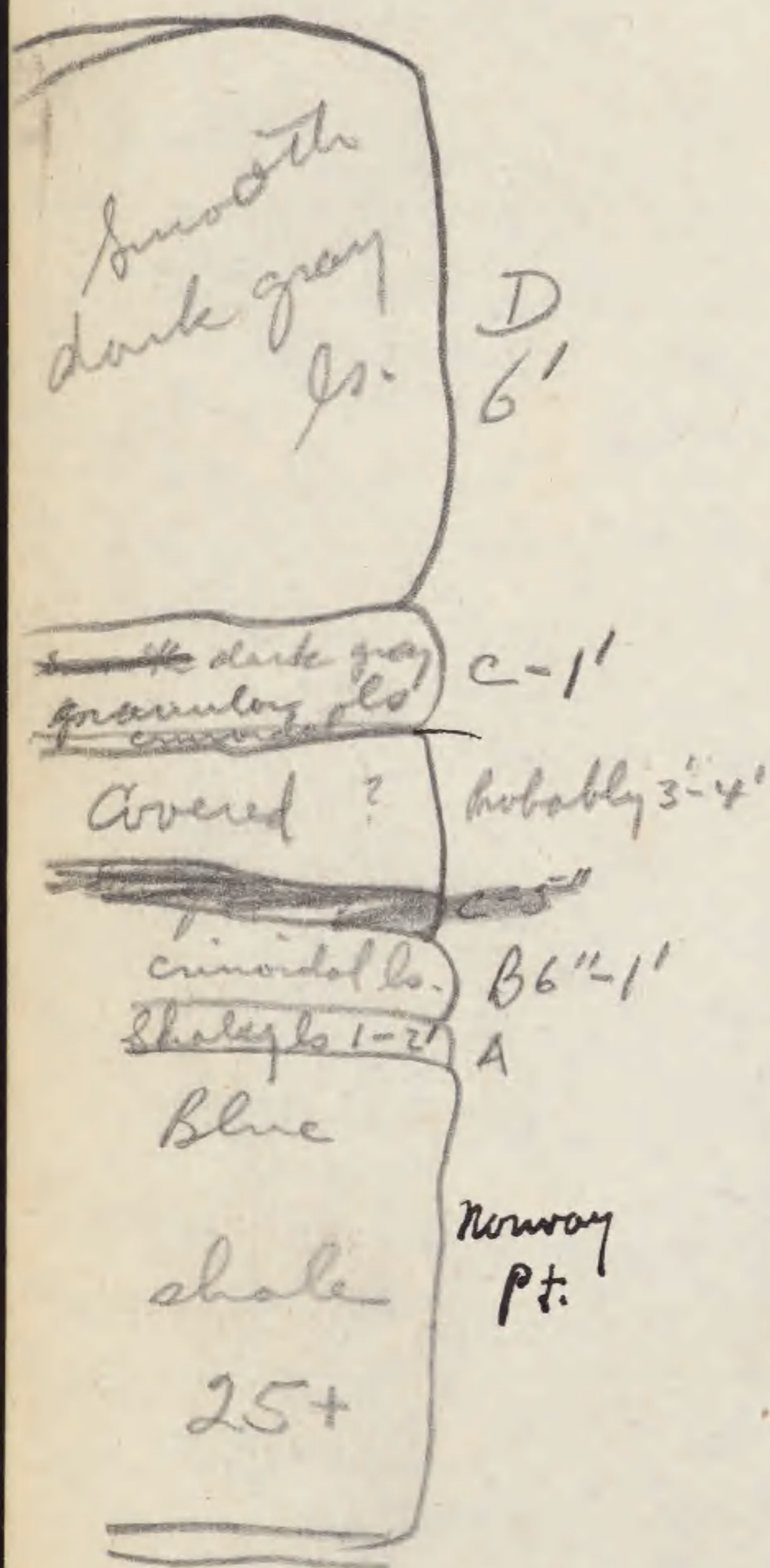
0.6 mile NW from bend of road on
privated rd. is a cut in blue shale
at base, thin crinoidal ls., thin (4")
blue shale & thin crinoidal ls.
Fossils are *Pholidostrophia*, *S. demissa*,
Spirifer aff. *conobrimus* type. This is
topographically lower than the
crinoidal ls at the bend. *S. mucronatus*

33.15-33.4 Patch of same ls as Aug 16'.

33.65 road turns to N. The thin limestone
beds underly the soil all along the
road and the road comes out at
the upper dam. Hence the
crinoidal beds overlie the Boom dam
section also. This material just
underlies the coarse crinoidal rock
and I would guess there is about
1-2' of it.

44a

Section of Potter farm beds above the Boom dam shale



B - small *Atrypa*, *Cyrt. alpenensis*, small fine-lined *Pentamerella*, *S. granulosa*, small *S. demissa*, small fine-lined *Atrypa*, *Dolotocrinus*, *S. mucronatus*, *Proctus*. This coarse crinoidal limestone is exposed for fully 60 yards along the road and exposes a vertical mass of 6" to 1'. The upper 5" is considerably leached and replaced by silica. This stone undulates along the ditch to the base of the first terrace a little N of the first house on W side of road. Above the crinoidal stone there is a covered interval of 5' then ~~crinoidal ls.~~

C - ~~dark gray~~ fine-grained *S. pholidostrophia* crinoidal ls at base with - *Cameroiphoria*, *Pentamerella*, *Cyrtina*, *Stromatopora*, *Dioites*, *Phacops*. This is opposite 1st house on W side Rd. S of corner

D - smooth, fine-grained dark gray ls. weathering ash gray - *Pholidostrophia*, small *convexum*, small *Canaana*, small coarse *Strophodont*, *C. boothi*, - 6' thick

Probably ¹⁵⁻ 25 feet of rock to top of *Stromatopora* zone down road (C)

42.85-
44.5-6
45.1

Aug 16²
Orchard Hill 1739

A - unfossiliferous gray ls capped by
a few inches shaly ls. abounding
Cyathophylloids & other corals.

B - hard ls & shaly ls abounding in
Pentamerella, S. mucronatus &
Lyritina

C. Hard gray ls. with Pentamerella

D - poorly fossiliferous gray shaly ls.

F - hard gray ls. about 8'

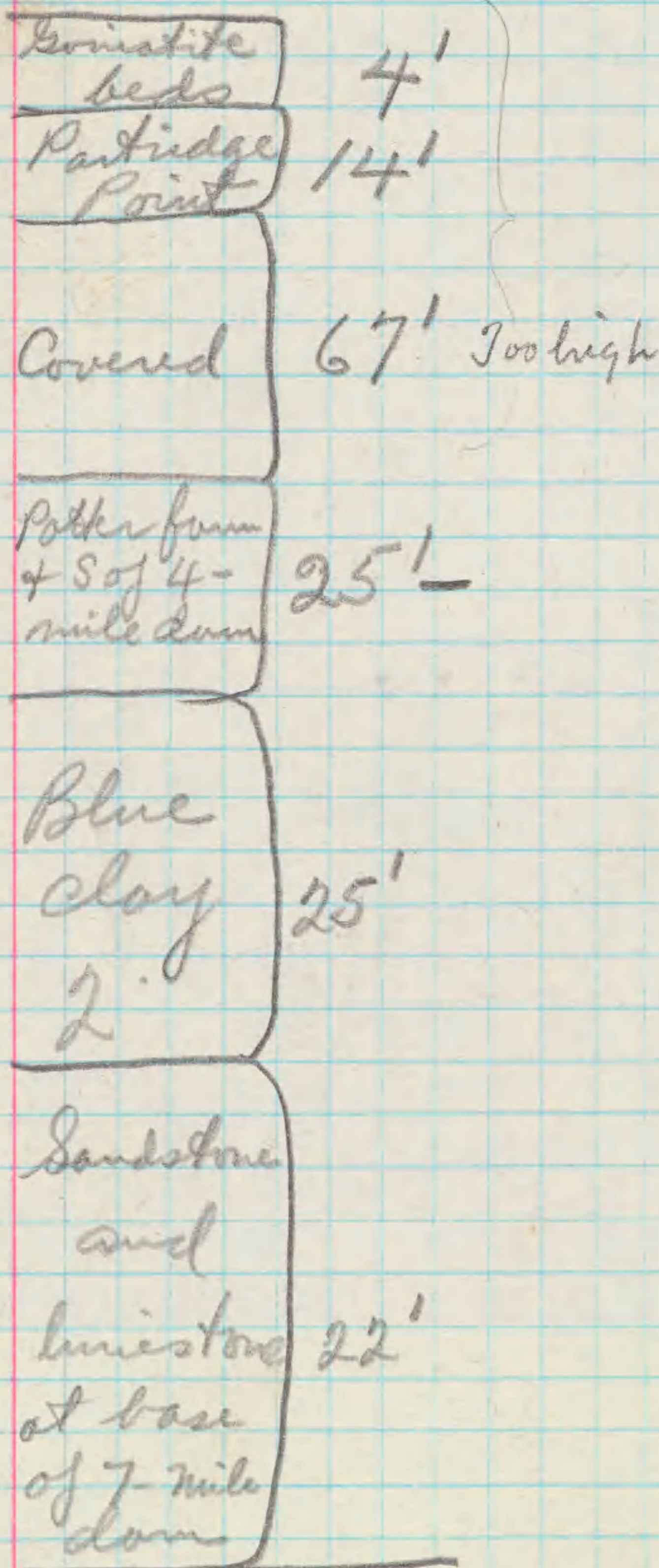
This is a roughly circular
mass with ~~quadrant~~ universal
dips. There is black gray ls.
and shaly ls. Corals are
abundant in the shaly ls.

4b

Section of Thunder Bay Composite

1740

80'



157

Aug 17

1741

47

Section in Michigan Alkali Co
Ananys

A- shaly, heavy bedded ls, blue gray
in color, 12' thick.

P. rana

Big Spirifer

big Atrypa

" S. concava

Atricularia c

S. mucronatus

Stromatopora

big Schizophoria

Big spinose Platyceras

Favosites

Cystiphyllum

Big Gypidula ^{romingeri?}

B- consists of about 20-25 feet of a
variety of rocks all stained brown
or black from bituminous matter
In the lower part the rock is
bituminous granular ls containing
many cavities partially filled by
dolomite. Fossils here are -

Camerothoria

Cranana

Gypidula large & small

Cypriacina

Cynocardium a

Fine-lined Atrypa

Bryozoa

Small Strophodont

Adelotoceras (lower 10')

Orthoceras

C- About 21 feet of heavy bedded
grayish brown, 4 in to 8 in x ls
abundant in a small to large
fine-lined Atrypa very abundant in
the shaly partings. Other species are
S. mucronatus small & slender, a
small gibbous mucronate Strophodont
S. concava type, a few corals. Corals
are scattered through. Dictyonema.
Phacops, Proetus, big Spirifer.

blue clay 3'

Buff xln
ls. with
huge
Accumularia
Reefs.

57' ±
D.

↑
Alpena

slide pathing 2" - 3" - level of reefs many fossils

Heavy-bedded
brown gray
xln. ls.
with fine-
lined Chippa

21' C

↓

Brown ls.

Shaly sh
ls. + porous
ls.

20' B-
25'

Newton Ck.

Shaly ls
blue gray in
color

12' A

Genshaw

floor of ay 500' above sea level

62' by Barometer

48

In the black shale at the top of the brown ls. were seen mucronate *Pholidos trophia*, small *Strophodontia*, *brachyura*. The upper 10 feet just below the black shale, which was seen on the north wall only, is fine-grained brown porous ls. The lower 10+ feet more clearly bedded and darker in color.

On the north wall in contact with the 2' of black shale are about 5' of brownish shaly ls. interbedded with white plates of corals & stromatopores. This bed is not present on the south wall of the quarry.

D - mostly buff xln ls. with fossils difficult to get owing to massive & semimassive rock. The big white *Acervularia* reefs are bedded on this level.

57
21
25
12
115

Highest Pt. of Dy. — 622' or 44' above lake level
Elevation of floor of Dy. ^{578.5} 503'
First floor level (Reefs) — 565'

Quarry is 119' deep.

Scotty says 126' to crusher, said to
be rock figure.

1743

Wessel Road Section

4A

00.0-0.4 Black Alpena (Killsars ls) 0.4 mile
 A. So of section line to the north. Fossils
 seen are:

Lynoceras (check)
 Ostracods
 Small Strophodonts
 " Atthyris a
 Productella
 S. mucronatus

Small Syridula
 Conocardium
 Digitate Favosites
 Agarularia r
 Proetus a
 Phacops

0.4-1.0 Section line —

1.0-1.1 — Gray fine grained ls. forming a flat —
 only upper surface visible —

B. Small Pentamerella sp. Acervularia r
 fine-lined Atypus Cup corals
 S. concava, Small Atthyris

1.1-1.

Long Lake Rd Section 1744

5 A17^A A - 0.2 miles S of Killian ls. outcrop - Killian ls

A17^B B - 0.65 miles S of Killian ls outcrop - same exposure as B on Wessel Road - with small Pentamerella, S. concava, small Athyris, cup corals.

A17^C C - 1.0 - mi. S of Killian ls. outcrop. Gray shaly ls. with many small Athyris, Pentamerella, S. concava, small S. demissa, large snail occasional corals. It is much like the beds ~~mentioned~~ described as B. Pterinea

A17^D D. 1.95 - gray crinoidal + fine-grained ls. containing Bygidula, C. mucronatus, S. concava, Pholidostrophia, Orthoceras, cup corals, Aceroulina, S. mucronatus. Some of the material is brecciated reef etc stuff. Some flint or chert in masses.

A17^E E - 2.05 - Gray shaly ls.

A17^F F - 2.4 on W side road massive reef breccia light gray in color with small Bygidula. In field gray ls with much chert and moderately large Athyris.

A17^G G - 2.55 - small ^{mass} on W side road - coarsely crinoidal + porous limestone with small gibbous Bygidula, Cypricardina, Athyris, Camerophoria,

A17^H H - 2.85 - medium gray, fine-grained ls, rather hard, containing large cephalopods, Goniatitids & Nephriticinids

4.25 - city limits.

Aug. 18.

Section of Alpena along
French Road. 1745

5/

All distances taken S of Killbuck
outcrop.

A18^A A - 0.20 mi. - gray fine-grained limestone
abounding in *Pholidostrophia*, sp.
micronotus.

A18^B B.O. 9 - By side of road and in
fields on each side N, E & W
are boulders of limestone, some
platy some massive. The former
are from the *Pholidostrophia* beds
at the King School. The massive
kinds are from the brown bed at
the base of the Alkali Quarry. Some
of the blocks loose here contained
Cranaena, small *Conocardium*,
Gomphoceras, *Orthoceras*, *Conerophoria*

A18¹

Gohl School Road Sw. cor.

Measured N from corner of sect. 18.
01.85 mi. plates of ls. with *Pholidostrophia*
& *C. coronatus*.

A18²

0.3 mile S of Palish School on east
side of road is a sink exposing
beds with fossils. Rock is gray
weathering ash and represents
very bottom of Alkali Qy. Here
occur *Aceroularia* a, *Stromatopora* a,
big *Gypidula*, *Schizophoria* medium
sized *Atrypa*. On slopes above
sink to S & E of it were seen
brown ls pieces with *Gypidula*
& *Cranaena*.

On the east side of the road

in the fields of the house at the section line on east side of road are big blocks of the soft, non-fossiliferous rock above the goniatites bed.

1746

1.1 mi. N of
County line

A183

2.9 miles N of R.R. track at Bolton and 0.1 mile S of school at fork in roads is an outcrop of Killians limestone on east side of road. It is probably the lower part of the formation. 0.9 mi. S of this exposure is outcrop of small *Athyris* ls overlying Killians.

A184

0.9 mile N of R.R. track at Bolton on west side of road (100 yds) is outcrop of coarse reef sand with *Pentamerella*, small smooth *Hypidula*. Contains *Aceroularia*.

This is 1.85
miles S of
school.

A185

Section along Long Lake Rd.

Stop-1. - 0.15 mi. south of Killians ls.
is Black Alpena.

2. - 0.25 mi. - loose pieces of Killians and lighter, gray ls. with *Aceroularia* and *Schizophoria*.

3. - 0.30 - gray fine-grained limestone in place with *Athyris*, big *Spirifer*, *Schizophoria*, *S. humerosus*, *Athyris*. This is undoubtedly at the base of the Alkali Bay

4. - 0.75 Town Hall school + section line
+ *Athyris* beds.

{3

5. 0.95-1 These are the limestones with the large snail and Pterinea, many medium-sized *Atthis*. So far have seen no loose blocks from the brown bed.

1747

6. ~~0.95~~ 0.95-1.45 — in field to west of road and 400 paces SW. Coral and reef ls. with big *Spirifer*, *Atthis*, & *Concava*, etc. Saw no blocks of brown ls. *Aceroularia* + *Stromatopora* a.

7. 1.7 reef lim place and along old road. Saw one loose boulder of brown bed.

8. 2.0 — grey fine-grained ls. with *Aceroularia*, *Favosites*, & *musonatus*.

9. 2.4 — gray fine-grained ls. with chert. Here was found the piece with *Gomphoceras* & *Conocardium*. This was the only such piece seen.

A18'

Thunder Bay Bay

A — reef ls.

B — see blue shale collections

C — hard knobby & reef ls. with shale partings! — *Favosites* (big), *Stromatopora*, cup corals, small *Spirifer*, *Styria*, *Pecten*

coral ls 7' + C.

Blue sh 8' B

gray ls with large white *Aceroularia* reefs. 40' A

The surface weather yellow

Aug 19.

1748

54

Section on section-line at Town
Hall School - all measurements
from Alpena - Long Lake Road

0.15 - gray ls. with many small *Atypa*,
Pholidostrophia, *Pterinea*, *S. mucronatus*,
Atypa.

A19'

Section on County line

0.30.

A19' A - Killians limestone (near top)
This is along the north line of NE $\frac{1}{4}$ section
3, T32 N, R7E, 0.3 mi. W of corner.

A19' B. 0.50 miles farther west is a foot
of gray ls. with crinoid debris, *Atypa*,
Pholidostrophia, *S. mucronatus*. The
rock weathers brownish gray. It is
like the rock at Kings School with
the exception that *Pholids.* is scarce.

A19' C. 0.65 - gray crinoidal limestone
weathering brown. Contains *Schizophoria*,
Acervulina, small *S. demissa*, *Atypa*.
This is estimated to be 4 or 5 feet
above Killians.

county-line
Along old road west of Bolton
road are silicified limestones with
Atypa, *Cyatina*, small *Atypa*, small
S. demissa. Fine-lined *Atypa* like the
one in basal brown bed.

55

Aug 20.

1749

3
2
1
2

25

- A About $0\frac{1}{4}$ mile west of Beebe School comes black shale pit with abundant *Styliolina*. At Beebe school a little west of the turn at the school is peculiar unfossiliferous smooth gray ls. with solution cavities. This is almost the actual contact. Loc. 24
- B 0.2 mi. N of the school (Beebe) and a few feet lower are limestones with *Ostracods*, *Conocardium*, small ~~Styliolina~~, digitate *Favosites*, small *Atthis*. These beds are in middle + top of Qy $\frac{3}{4}$ mile N. of B.
- C 0.2 mi. north of B - gray crinoidal ls. with *Gypsicrura*, *Stromatopores*, etc.

- B 0.2 mi. N of the school (Becke) and
a few feet lower are limestones
with *Strocods*, *Conocardium*, small
~~Strocods~~, digitate *Favosites*, small *Atyris*.
These beds are in middle + top of Qy $\frac{3}{4}$ mi. N of A.
- C 0.2 mi. north of B - gray crinoidal
ls. with *Gypichela*, *Stromatopores*,
etc.

- C 0.2 mi. north of B - gray crystalline
ls. with *Gypsicula*, *Stromatopores*,
etc.

Loc 25 Quarry at Afternoon

Lower part in same beds as those seen at Sorenson Quarry. Above are bedded ls with ostracods and on top of ls + black shales containing *Atrypa* & *digitate Favosites*. Quarry is about 30' high at highest Point. The section in the quarry is the same as that along the Road to Beebe school (West line of NW 1/4 sec 13, T 34 N, R. 2 W.

Sorenson Bay.

This is along the section line about 0.4 mile S of the NW corner of sec. 12, T 34 N, R 2 W. The rock is a gray massive limestone greatly pitted. Suggests fresh water limestone. Contains many clams. This bed appears at the base of the Quarry $\frac{3}{4}$ NE of Afton.

5.35 corner
0.6.75 mic - funny S. Sorensen by

Lower Loc. 2750

56

Below dam on Black River at Lower is gray ls. containing large *Dypidula*, *Pterinea*, *Spirifer*, *Strophodont*, *Conocardium*, *Acerularia*, *Stromatopora*. This combination + particularly the big *Dypidula* suggest the beds just above the *Phillips* ls. SW corner NE 1/4 sect. 3, T 34 N, R 1 E.

Quarry 1/2 mile SE of Afton.

Here there are 15 feet + of Buff granular and crinoidal limestone containing *Dypidula*, *Conocardium*, large *Strophodont*, *Acerularia*, *Stromatopora*. The ls. is very bifurcated. The appearance of the rock is the same as that of the brown bed at the bottom of the Mich. Alkali Co. Co.

Osgood Falls. Loc 30.

15+ feet of dolomitic rock abundant in *Stromatopora*, *Acerularia*, digitate *Favosites*. This is the lower Rockport.

Black Lake Loc 29.

About 20' of smooth gray unfossiliferous ls. resting on the floor of quarry which abounds in *Stromatopora* and digitate *Favosites*. This is the lower Rockport. The upper ls. is the upper Rockport. Above this ls. there are a few feet of shale.

57 Containing *Atthis*, small *S.*
demissa, *Pyrit. alpenensis*,
Spinifer, etc. This is thought to
be the shale above the Rockport.
This shale is capped by a
thin ls. bed.

58

Michigan Specimens 1752

Lepidasterella babcocki Schubert
 Plattsburgh, Steuben Co., N.Y.

From shale at Henry Pt
 Windy shore has many fossils
 which are like those for the sh.
 above 4 mi. down section:

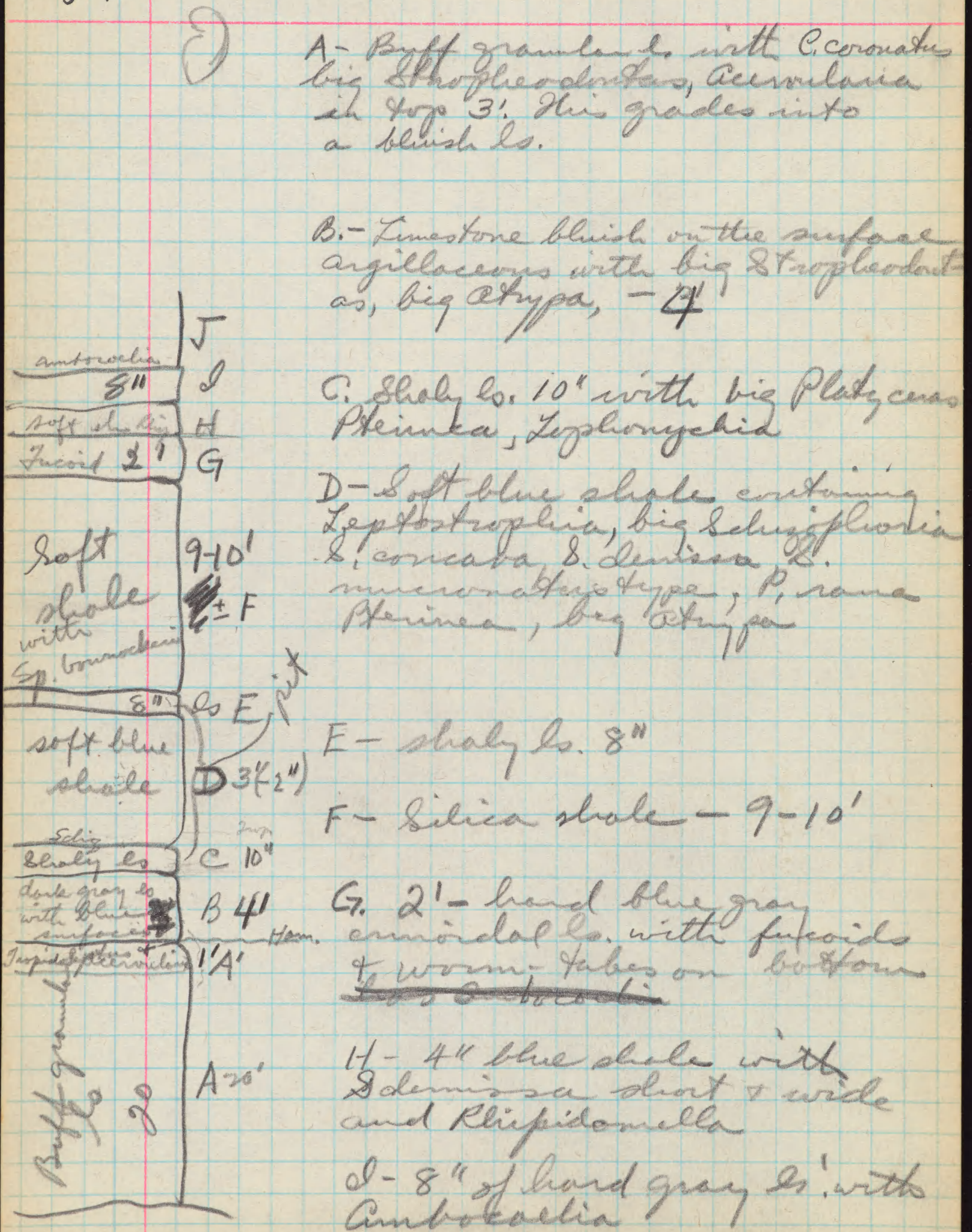
<i>S. granulosa</i>	Wide fine-ribbed, short
<i>Cyrtina</i> (large)	<i>S. mucronatus</i>
Small <i>Atypis</i>	fine-lined <i>Atypis</i>
Small <i>S. dentata</i>	Small <i>Pentamerella</i>
<i>C. coronatus</i> .	

Cut of B.C. & A. R.R. has lower
 Potter Farm stuff. with *Cyrtina*
alpenensis.

Fav. *turbinatus* also from 7 mile
 dam with *S. granulosa*.

59

Quarries at Silica



J - shale abounding in Ambocoelia and bryozoa, S. mucronatus

Quarries at Dilica, Aug 25.

Bed B - In fractured section this rather brownish gray rock suggesting Delaware but being much shaler and not so hard. It is in about five thick beds which are separated by brownish gray calcareous shale. Corals are abundant in the 2nd, 3rd, & 4th beds from the bottom. Here are cups and tabulate corals. The base of B rests on a one foot bed of the upper Columbus which is crowded with *C. coronatus* and a big *Spithifer*. The lowest T bed of B is 14" thick and contains *Acervularia*. This was not seen higher than this bed. It also contains *Spithifer* like *S. mucronatus* and big *Strophodontas*.

Fauna of B -

<i>Acervularia</i> (bottom only)	<i>S. concava</i>
<i>S. demissa</i>	big <i>Atypa</i>
<i>Schizophoria</i> (big)	" <i>Spithifer</i>
<i>S. mucronatus</i>	<i>Cyrtina</i>
<i>Pholidostrophia</i>	<i>Cratopora</i>
<i>Leptoptera</i>	<i>J. carinatus</i>
<i>Favosites</i>	

A' - Below the lowest T bed of B which has both Columbus and Dilica lithology is a 1' bed abounding in *C. coronatus* and *J. carinatus*. This bed has the Columbus lithology. This bed is just below the *Acervularia* bed in which *J. carinatus* also occurs. Further the *C. coronatus* bed (A') also contains the *J. carinatus*.

Range of *J. carinatus* - occurs in lowest of B which is ~~in the bed of~~ occurs in C and Andy MacNair's loose stone is doubtless from bed D.

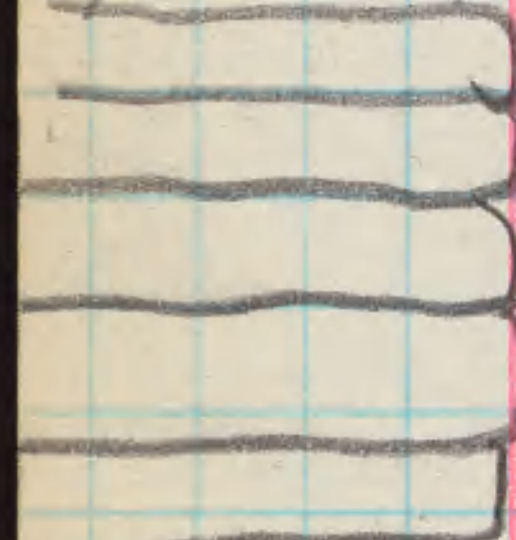
70

Fauna of D -
C. coronatus
Leptostrophia a
Strophodontas a
Phacops c

1755

Fauna of bed C -
T. carinatus
Lophonychia
Pterinea
Strophodontas

Dundee Columbus

 <p>A' S-14" T-14" U-2' V-1'</p>	Real Columbus	<p>A' - 1' - 14" with <i>Trapidolaptes</i> S - 14" buff to brown ls. with T - 14" buff xln ls with <i>P. elliptica</i>, U - 2' same - <i>P. elliptica</i>, <i>Conocardium</i>, <i>Productella</i>, <i>Cystina</i> V - xln ls. with <i>Pholidostrophia</i> big <i>Conocardium</i></p>
--	---------------	--

Aug 26
Plum Creek

1756

- 71
- | | | |
|------------------------|---|--|
| Black sh. | A | A - black shale with rolled corals at base |
| Dolomite | B | B. 6-7' of dolomite with poor fossils chiefly corals. |
| Shale + thin shaly ls. | C | C. Soft blue shale + thin beds of shaly ls. One layer of ls. has |
- | | |
|--------------|-----------|
| Leiorhynchus | Prana a. |
| P. lirata | Ostracods |
| N. lignata | Crinoids |
| M. subalata | |

Branch of Pipe Creek

Section now very largely covered - upper part in hard limestone. The soft shales are not exposed, but there are abundant blocks of shaly dark gray ls. weathering light ash gray. These contain + Leiorhynchus

also the upper beds were seen

Ind., Ill., Iowa, Michigan

1935.

Guy Campbell Collection
June 21, 1935.

1757

Look up (or write for) *Gypsicula romingeri*
described by Kindle from Indiana

Chara paper to Mr. Campbell.

Spent morning going over
Campbell collection. The afternoon
was spent on a visit to Falls
section at the Whirlpool opposite
the government dam. At bottom
~~was~~ (as exposed at the high river
stage when we saw it on heavy
bedded ls. with corals. *Spirifer*
gregarius) zone exposed a few
feet below the highest rocks
which are in the *Sp. acuminatus*
zone.

Agreed to send Mr. Campbell
certain literature, such as Pal. N.Y.,
vol. 4, and Clam volumes. See if a
copy of Nettlesoth can be sent.

2

1758

June 22.
Graves Dy. 3 mi. N. of Jeffersonville

Resting on the *Sp. acuminatus* zone are 3-4' of coarse calcareous sandstone with fragments of fish. Two specimens of *Sp. acuminatus* were seen in the lower part of this sandy bed. Contains brachiopods & bryozoa. Some brach. badly worn.

New Albany

nodular

Hard finely granular light bluish ls.

cherty gray ls. bluish gray

Blue gray ls. weathering sh. with a little chert

ss. acuminatus zone

on.

3"-4" F
10" E

4 1/2' D

8' C

12-13' B

3-4" A

Sophronoceras in upper 3'

12-13' - ft. of shaly blue-gray weathering ls. Fresh fracture is brownish gray in color. *Clonastes* (*Gandellanus*) is abundant. *A. princeps*, *S. oweri*, *S. formosa*?, *Sp. like macronotus*, *L. perplana*. This bed breaks into irregular lumps. It is more massive towards the top.

8' very cherty limestone with large *Sp. oweri*, *Atrypa*, *C. Gandellanus*. Occasional corals.

4 1/2' hard massive ledge of sandy, granular ls. in the lower 2' is an abundance of *S. oweri*, *Atrypa*, *S. demissa* (types), *S. concava*. The upper foot is more granular than the lower part. *C. coronatus* occurs about 2 1/2' below the top. *Tropidoleptus* occurs with *C. coronatus* in the upper 1 1/2'. The upper surface of the bed is very irregular. No corals.

10" Beechwood ls. - dark blue granular ls. with pyrite. Fossils large *Rhipidomella*, *Trachypora*,

3
C. coronatus, Atrypa, cup corals
worm burrow, 1759

2-4" nodular, pyrite layers with
probably phosphatic nodules.

2. photographs.

R. Hilton Farm.

SE 1/4 NW 1/4 51, north St. by. 62, near Prather
10-10 1/2' of light gray crystalline
and crinoidal limestone (Beechwood)
Atrypa, Vitulina, and Pentagonia
with Spirifers were seen.

Hedrophylum occurs with A.
fultonensis, Leptaena, Zaphrentis
deformis, Rhynchonella, Sp. bynesi,
S. demissa

Section 113 Clark Grant

Section of Silver Creek, mostly
all shaly limestone. Chert rare
in upper part.

Sp. arvensis

Camarotoechia

Sp. varicosus

The rock is blue gray breaking into
fine lumps.

B. sulcomarginata

Ch. yandellianus.

L. perplana

Fragments of small crinoids

NW cor. Sec 90 - to Clark Co Cement
Mill, 1/2 mile SE of Sellersburg.

Beechwood - basal congl., black pebbles,

Huddle 374 Picture 3.

4

Send all Teller & odd
trays to Mr. Campbell.
Loan Mr. Campbell Eatons
By-Passing & Barrells diastems

June 23, 1935

Green's Quarry

Excellent exposure of Beechwood

Lower layer 50" with 2-3" conglomerate
of phosphatic pebbles. Above follows
27" limestone with 2"-3" of phosphatic
pebbles at the base

New Albany

27"

In the lower foot of the Beechwood
and including the conglomerate bed
were found:

Vitulina pustulosa

Pentagonia

Centronella

Atrypa

Platyceras

Sp. oweni (?)

Sp. divaricatus (upper part lower bed)

Productella

P. carinatus ?

R. penelope

C. coronatus

A. spiriferoides

Proetus

P. flabellum

Reticularia

Sp. sculptilis

L. perplena

Pholidostrophia

Phacops

D. inaequistriata

Rhipidomella

S. concava

Silver
Creek

50"

Middleton Ky.

1761

5 300 yds. S. of B + O. S.W. R.R. depot.
Lexington, Ind.

NA

9" F

A - 38" of ~~hard~~ softish light yellow
or buff gray ls., very fine-grained.
This bed abounds in *Sp. acuminatus*.
Some chert at top of layer.

B - 7 1/2" hard blue gray limestone
with thin chert drapels. Abounds
in Rhipidomella and Schizophoria.

C - 23" - *Sp. macrus* (of Campbell zone)
Brownish gray limestone
with *Sp. macrus* & *Hadrophyllem*
(in middle of bed).

D - *Stropheodonta*, *Hadrophyllem* in
base, *A. fultoniensis* abundant, *Sp.*
bynesi (name of zone - Campbell)
Shaly weathering limestone
Productella. 2 feet.

E. 57" Silver Creek

F. Beechwood 9" - sandy, light
bluish limestone. Lower surface
irregular. Hard sandy limestone
like basal Tully. Contains
Chonetes coronatus. Suggests
upper bed of Graves Dy.

24
23
57
90" - 7 1/2"

Silver Creek

Sp. bynesi

Sp. macrus

Sp. acuminatus

5-7"

E

2' D

23" C

7 1/2" B

3' 2" A.

Lexington Depot

1762

See Section by Border

6

NA

C. coronatus
I. cinctus

2' C

C - 23" hard sandy ls.
with C. coronatus, I. cinctus,
S. concavus, small chonetes,
Ceratopora. Similar to
Leaves by upper part bed D.
basal contact very irregular

Silver
Creek

B
A-4 1/2'

B. - highly magnesian ls.
~~C. coronatus, I. cinctus,~~
~~S. concavus, small chonetes, Ceratopora~~

Onondaga

A

8

June 25

1763

S W $\frac{1}{4}$ 26-135-2W - About 12' soft
weathered shale with *Leiorhynchus*
shale is brownish gray in color,
very sandy, rather heavy-bedded

J. 25'

Lenticular weathered, massive ss.
interbedded with shale. No fossils seen.

sh 6'

SS 1'

sandy
sh 2'

ss. 2'

J 25-2

Twenty-seven feet above intersection
of creek + road (about 495') are 20'
of hard sandy and cherty limestone.
Near the base the rock is blue gray
granular very hard. In a layer
of this hard material were seen
Pentronella, *Utulina*, *Tropidoleptus*,
C. coronatus, *Douvillina*. About one foot
above this layer are cherty limestone
with encrusts.

over Above this lower layer the
rock is browner, sandier, platy
and with much more crinoid
debris. The main outcrop is in the
form of ~~four~~ ledges, the lowest
4-5', the next 2', the next 3' and
the top one about 1 1/2'. These are

Between the Vitulina beds &
the Misenheimer was a thick
band in the soil which
looked as if it had been
ls. There must be alternation
of heavy-bedded sandy ls.
and shale between the
Misenheimer & the Lingle

This makes the Misenheimer
(exposed) 12-15' thick.

9

separated by covered intervals
which may be occupied by
shale.

1764

June 25²

1 1/2 mi. below Mtn. View

A-B Along Clear Creek feet of
gray hard limestone clippings 5-10'
About 8 feet from the base the
next four feet of limestone
abound in small corals, large
Spirifer, small Chonetes and
Microcyclus; Leptaena, Schizophoria.
The presence of the last two suggests
pre-Hamilton beds.
C Sandy shale of Misenheimer lithology

E D- somewhat shaly ls. with
small Chonetes, small Spirifer
S. denissa? 4'? Bituminous odor

4'D Above the ls. D. 13' vertically
1-2' C comes another ledge of limestone
with the following fossils

4' B F. Lowest exposed bed very
hard ls. with Tropidoleptus
rare. Above this is shaly
sparsely crinoidal ls. with
L. perplana, small Spirifer,
small Chonetes, Platycephalus,
P. rana. A. 'decussata'?

The uppermost beds carry
a little chert and are sandy

On a loose piece an
abundance of T. carinatus and
C. coronatus was seen with
C. flatellum.

Hamilton
6-7' F
N.
covered
grey ls.
Sandy sh
Corals
and
Microcyclus
5'

10

June 26

1765

A - The Grand Tower limestone is blue gray weathering in very heavy beds 4-5 feet in thickness. ~~at~~

B - The upper 5' 6" of the Backbone section is composed of very hard rather thin bedded limestone and shaly limestone at the top of which were seen Microcyclus, small cup corals, Phacops, Otygia, Stropheodonta, sp. like Varicorhinus, Spirifer like oweni. The upper 16" carry much the same assemblage.

So far as I can see there is not a great deal of reason for separating these beds from the Grand Tower below.

In addition to the above fossils from the Microcyclus beds, the upper layers carry Schizophoria & Leptaena

These same beds are exposed farther north at the north end of the Backbone. The Tropidoleptus beds reported by Weller were not seen. It seems that the Wisenheimer shale should come above the Microcyclus

The Illinois Devonian seems to me to be as follows. Judging by the section at Devil's Backbone the Microcyclus beds belong to the Onondaga. This is shown by the presence with Microcyclus of Schizophoria

16"
Microcyclus
50"
B
Grand Tower
A

11 and Leptaena. It seems to me that, if the whole Onondaga is cut between the Misenheimer shale and the Dutch Creek sandstone, the Microcyclus bed will be missing at Single Creek. The Misenheimer shale, I believe, probably overlies the Microcyclus. This is suggested by a covered gap between the Microcyclus beds at Clear Creek and the Hamilton and by the fact that the Trochidoleptus beds are superposed on the "Backbone". The steep slope opposing the Microcyclus beds suggests this.

I think Savage was misled by Microcyclus into calling that bed Hamilton and was equally misled by Leiorhynchus into placing the Misenheimer shale in the Marcellus.

There must be shale at the Backbone and between Weller's Trochidoleptus beds to have produced the dip slopes on the Microcyclus bed.

July 9.

1767

12

By Charlevoix Rock Products Co.
SW¹/₄ SE¹/₄ 28-34N-8W.

Dolo-
mitic ls.

12' +

B.

A. - Blue shale with *Athyra*,
Cystodictya, *Cameropterid*
(Stambrook has a good one),
Aceroularia, small *Strophodont*

3' +

blue sh. A.

B - at base platy dolomitic
ls. with *Stromatopora*
about 2' - 3' ±. Above this
are porous, petioliferous
dolomitic ls. with scattered
thin beds of oolite. Fossils
are slugs, snails (small) and
a small *Athyra*

A = upper Gravel Pt.
B = Lower Charlevoix

13

July 10.

1768

Gravel Point

Lowest beds of section are about one foot of brown rather hard limestone with large Stromatopores. The rest of the section consists chiefly of brittle shaly limestone (like the Trilobite beds of Lake Erie) and the lower part S. concavas occur, and the lower middle part (Sp. iowensis?) (see over large specimen in the Museum) occurs with Cyrtina, Athyris.

In the upper part Acumularia occurs rarely. Chonetes emmetensis occurs in all parts of the exposure except in the beds carrying Stroms. Pholidostrophia has the same range I suspect Pohl's range for the Chonetes is too small.

Stambrook has best specimens of the Sp. iowensis.

~~Nowood~~ Bee

Section 1-2 miles NW of Nowood

On the beach at the lowest part of the section are about 2' of shaly, blue limestone abounding in fossils

Cyrtina
Athyris
Heteroschisma
Gennaeocrinus
Sp. bimesialis?
 large Spirifer

Stropheodonta
Cranania
Athyris
Pentamerella

14

This bed suggests relationships with the Partridge Point beds.

This is followed by about 2' of harder platy crystalline limestone containing scattered corals (Favosites + Cup corals) and Atrypa.

Above this are about 10-12' of thin bedded, platy limestone with several courses of chert. This limestone is beautifully mud-cracked.

Above this bed are about 12' of heavy-bedded dolomites, saturated with pitch. In this we found a few snails and Gemmatites? This upper heavy-bedded material may be our Squaw Bay.

Above the dolomites is a thin bed of shaly ls. with Schizophoria, Pentamerella and Leiorhynchus.

1770

Quarry Potoskey Portland Cement Co.

15

Section on shore between plant and crusher.

A - 9" to a foot of light grey shaley, brittle limestone containing many bluish irregular markings, perhaps worm burrows:

10"	D	<i>C. emmetensis</i>	Large <i>Atrypa</i>
18"	C	<i>P. liata</i>	<i>Phacops</i>
		Sp. large	<i>Proetus</i>
9"-1'	B	<i>Stroph. concava</i>	<i>Vestimentaria</i>
9"	A	Small <i>Somphoceras</i>	<i>Actinopteria</i>
		<i>Pholidostrophia</i>	<i>Atelypis</i>

B - 9" - 1 foot chocolate brown ls. with *Gypidula*

C - 18" barren, brittle ls. with worm-tubes?

D - about 10" shaly ls. with
Acervularia *Actinopteria*
Pholidostrophia *C. emmetensis*

Section in Qy 1771

16

Dark shale		A - at top 2' of shaly brown ls. with blue tube-markings <i>Atrypa</i>
Coral Bed 20'		B - Massive, heavy-bedded buff ls. with corall debris
K 4'	23'	C - Brown massive ls. with <i>Pentamerella</i>
1' brown ls.		
1' shaly ls.	I	D - Heavy-bedded buff ls. with <i>Stromatopora</i>
1'	H	
45" brittle shaly-breaking brown ls.	G	E - About 7' of heavy-bedded limestone brownish gray, serpi-x-lm., with black shale between the partings.
4' blue sh + ls.	F	^{6" gray ls.} F = 3' blue gray sh. followed by 1 foot shaly limestone, 16" of blue gray shale, then about 1' of hard gray ls. all abounding in fossils. This is the zone from which all the fine free fossils comes: <i>Cyrtina</i> , <i>Sp. mucronatus</i> , <i>Ch. emmetsensis</i> , <i>S. concava</i> , etc. The upper foot of F passes gradually into the brown ls of B.
7' brownish gray ls with blk sh partings	7' E	
Buff ls.	4' D	
2 3'		
3 1/1'	C	
Brown ls		
3' massive buff	B	
Covered	A	
		B - 45 inches of hard, brittle, shaly-fracturing brown ls. Has the bluish tubular markings. Large <i>Stropheodonta</i> ,

1772

17

H - 1' shale like that below

I - 1' shaly ls. with large *Atrypa*
This is light grey in color. This
is bed A. of the shore section

J - 1' brown limestone containing
Atrypa + *Pentamerella*. This is bed
B. of the shore section.

Zone 2
Pohl

K - 4' + of light gray ls. with
blue tubes. No fossils. On thin
layers 3", 9" below top is
~~covered~~ 5' 1/2' made up
of *Platystrophia*

Pohl's
emmetensis
zone

L - About 20' (18 hammers) of
nodular ls. abundant in
Acavularia, *S. concava*, *Fossites*
cup corals.

M - ~~Dark blue shale~~ Brown
granular ls. with *Acavularia*
5'

N - Gray argillaceous ls -
0 - 4'

O - Three beds of massive ls.

P - 6" black sh

Q - 9' ls weathering blocky.

18

see
Pohl for
above

20' +

many overturned *Stromatopora*
Bed 1 of Potoskey form. of Pohl.

coaly layers (1")

33"

Dark gray ls. with thin carbonaceous bands.

8"

breccia bed flat pebbles in upper part

2 1/2'

Heavy bed of light gray ^{to brown} ls. with thin ^{Potoskey} ~~charlevoix~~ carb. bands

31"

Buff ls. with carbonaceous laminae

9' +

Pelecypod-Gastropod zone
Light gray limestone

19

Section on shore opposite Penn.
R.R. station at Bay View

1774

21"	Weathered massive ls. Small digitate Favosites at base - Near top Cranaena, & smooth Pentamerella.
Favosites 13"	Brownish limestone, cherting to plates.
15"	light, yellow-brown, hard limestone
17"	Thinly laminated ls., brown gray. Weather to plates
1' ±	Light buff, hard, massive ls. with Favosites
Hiatus	
6"	bluish, calcareous shale
1"	

70

Section E. on beach from
preceding 1775

Hard

7' 1/2

Pelecypod - Gastropod bed

F

9" Favosite bed (see section on preceding page)

D

5' Sparsely fossiliferous limestone beds.

Top of Gravel Point Stage

7' ± C

Blue shale (said to be same of Charl. Rock. Prod. Co.)

B 1' ±

blue calcareous shale

A

3' + Hard brownish limestone abounding in large Stromatopora, Atrypa, Pentamerella rare. Found small Camerophoria here 1938

{ Hopper xls in ls. seem to have come from below the Stromatopora bed A
OK



Pohl's loc. 21 1776

24

Mud Lake

E 2'

Dark gray shale with abundance of *Strophodontes* (coarse), large *Spinifer*, *Sp. mucronatus*, big *Pentamerella*, ball *Favosites*

D 7'

Hard layers of limestone separated by thin beds of shale. *Sp. mucronatus*, *Athyris*, *Strophodontes*, fine lined *Athyris*, small *Reticularia*

C 4' 7"

Shale with thin ls. beds. Ball-like *Favosites*, *Sp. mucronatus*, coarse & fine *Demissa*, large *Athyris*

B 4'

Fine-grained yellow or buff, massive ls. big *Pentamerella*, *Athyris*

A 3'

Thin, crinoidal & shell breccia with *B. petoskeyensis*, *Cyrtina*, large *Spinifer*, *Sp. mucronatus*. 2 thin layers shale at top

Gypidula petoskeyensis (floor of A)

This locality suggests the Potter Farm beds.

22 July 13.
 Section on Road at Center of N line
 of Sec 30-35 N-1W, 2 mi. N of Afton

A - Lowest beds are 6 or 7' of shaly
 ls or limy shale, light gray in
 color and yielding free fossils
C. alpenensis *Chonetes* (fine lined)
Productella *Pholidostrophia*
Pentamerella large

These beds suggest the layers under
 the Killians.

B. - Dark gray to black limestone
 weathering and splitting shaly. Near
 bottom a little black shale. This
 appears to be Killians
Large Sp. mucronatus *Acervularia*
Large Spirifer *Goniatites*
Ball-like Favosites
 About 12'.

Warthin found a layer with large
Pentamerella in a small bed
 to the N which he thinks underlies
 the bed A. I believe the rock dips N
 and the *Pentamerella* overlie Bed A.

23

Section in Afton Dy.

Dark gray, finely granular ls.
 becoming lighter & smoother at top.
 10-15' S. pennatus.
 8-10' Large Pentamerella a, Pholidostrophia,
 snails, Stromos, Stroph. costata, Large
 Stroph., Accerularia, Cyprina, Suggesta
 Strom. bed of Northern Lime Co. Dy.

Thin beds of limestone separated by
 black shale partings. Dark gray to
 black ^{finely} granular ls.
 6 1/2' Favosites (digitata^a and massive), Accerularia,
 cup corals, Gomphoceroids

7'

Finely granular, porous and oolitic
 limestone in two heavy beds. Light
 faintly yellowish gray.

5'6"

Dark gray thinly banded limestone, almost
 black, Welleria.

15"

Soft, sandy, brecciated layer, rusty
 Hard, smooth, light gray ls. roughly pitted
 on exterior. Cup coral at top.

6'

Hard
 dark
 gray
 smooth
 ls. with-
 out pits

4'

covered
 to floor

10'

NE side
 all rest
 S side

24

July 14.

Visited Rockport, collected all day.

July 15.

Shalepit (use this)
Abandoned Dy. Alpena Portland
Cement Co.

The base of the Genesaw is
to be taken 5 feet below the first
thin ledge of hard limestone. In
this 5 feet the shale becomes
harder and more calcareous
and Genesaw fossils appear
mingled with those below (the
C. coronatus) and many of the lower
fossils run into the Genesaw.



July 16.

25

Dundee at Calcite.
Michigan Limestone & Chemical Co.

Trench in floor of quarry exposes 40' of rock, the lower 20-25' of which is dark brownish gray limestone containing many *Strophomena* and some black shales. The upper 15-20' are of lighter brownish gray ls. Fossils seen are *A. spinosa* type, *A. reticularis* type, a large *Procardium* (Wartini), large *Paracyclas*, snails, no large ones seen, *Gypsidula*.

Between the Trench and the main quarry face is a gap of about 5'. Then come 55 feet of limestone lithologically like that below. Fine-lined *Strophomena* and *Schizophoria* occur in the lower 20'. *Gypsidula* is common to within a few feet of the top.

From lower Bell Stairbrook has excellent
snail, *Elytha* & blastoid

Paracyclas occurs in lower Bell.

Iowa

Sheffield ————— Chemung

Lime Ck. { Owen
Cerro Gordo } Hack-
Juniper Hill } berry
Independence + St. Quincy. ?

Shell Rock { Mason City
Rock Grove
Nora

Cedar Valley { Stomatopora
Cranaena - Petosky
Waterloensis
Pentamerella
Collaury { bellula (chonetes)

Muscola { profunda
Alpena { independensis // Hydr.

1807

1. Atrypa (Independencia) Zoo
4-35 fl

Where thick is divided
into.

a. Gyrogonas beds

6. bare trees

c. Sp. Brunnealis bad
(Hypothyraxalina)

2. a. (profunda) zone
4 - 30 ft.

Littleton member
2-55 ft thick

3. Atrypa (Bellulca) zone

4. Pentamerella zone
has corals bed.

5. Waterloensis zone

Coralville member

12+ — 35+

6.

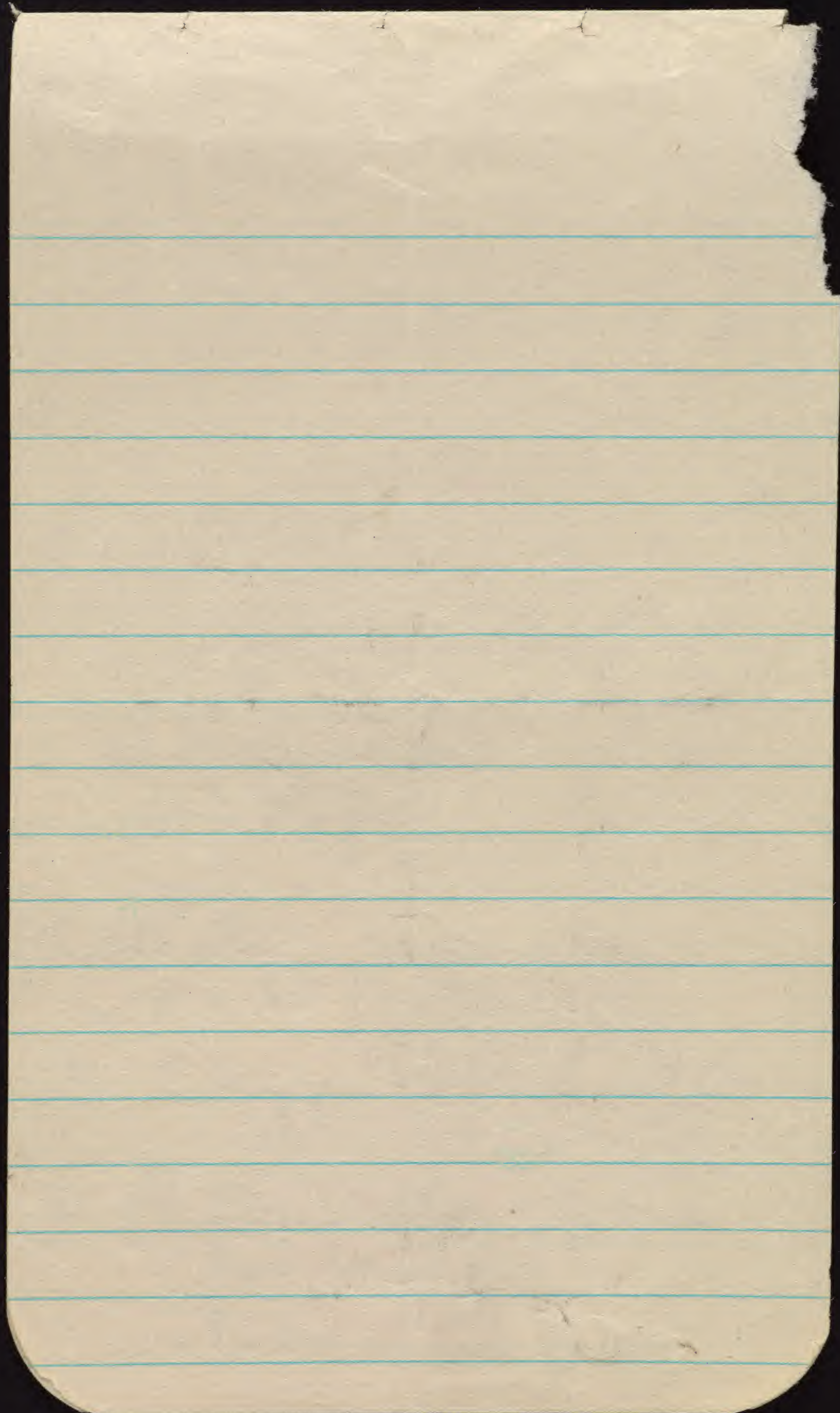
(Cranaena) covenensis zone
(has corals in south part)

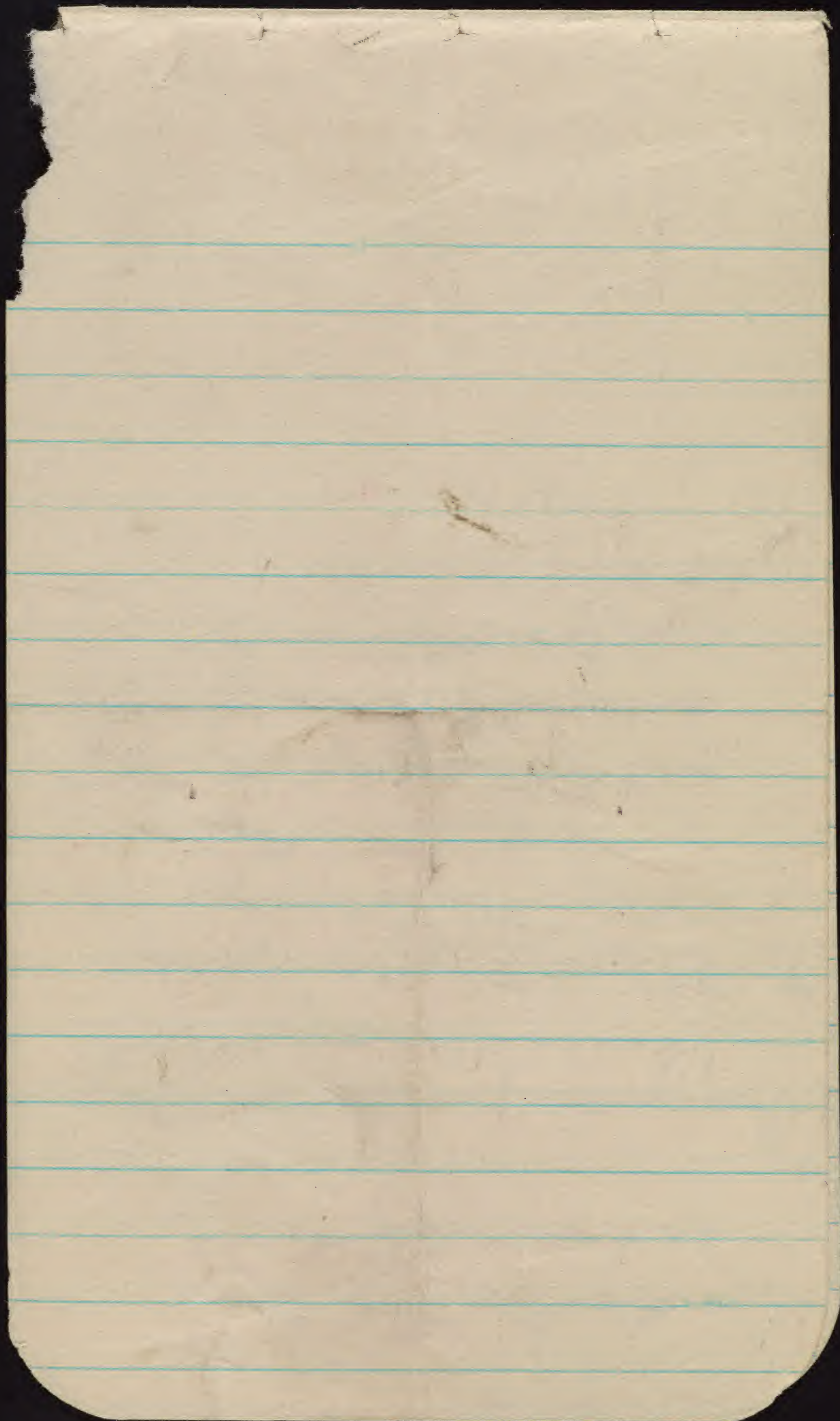
7.

Stromatopora zone

has ^{spherical} stromatopores at
top, much

sub-lithographic ls,
dolomitic in places,
not fossiliferous for
most part.





1781

Section Brandon, Iowa

3. ^{and vicinity} Coralville member - 12 to 35'

B. Stomatopora zone

Spherical Stroms. at top,
much sublithographic
limestone in places.
Sparsely fossiliferous.

A. Cranaena iowensis zone

Coal bed in south part.

2. Littleton Member 2-5-5'

C. Waterlooensis zone

B. Pentamerella Zone.

A. Davidsoni bed.

A. Atrypa bellula zone.
Strophoceras at base

1. Linwood Member 4-35'

C. Sp. bimissialis beds.

B. Barren beds

A. Strophoceras bed

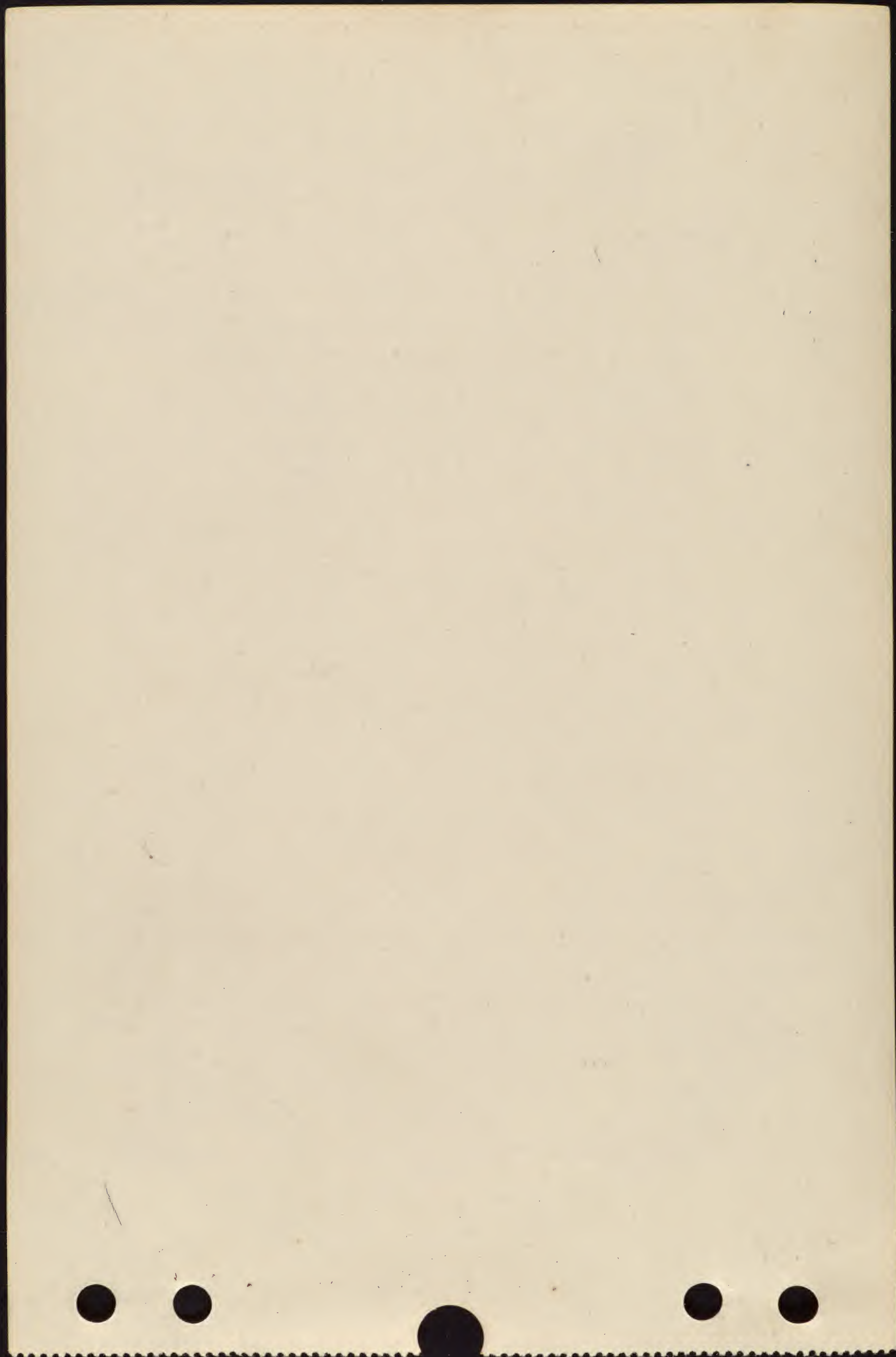
27

Send Scotty Levdigianus
from Ighaw Bay

July 18.

N of Cemetery are piles of debris
from Potter farm beds taken out
of road. Among the blocks are
some with the same lithology
as seen in the dy along the
R.R., the many with the large
snails.

Stambrink believes the Potter
Farm beds correlated with
the *Canaena rowensis* zone
of the lower Coralville.



24

2 miles W. of Port 1783

Large Gomphocerina in coral reef sand. Many bryozoa, Pentamerella, Cranaena. Ledge now broken up and spread on road.

July 20.

Cut of B. C. B. & A. R.R.

About 200 yds west of river and forming the crest of the terrace on the west bank of the river are 6-7 feet of bedded limestones, the upper 5' crystalline the lower part shaly.

Sp. euryclines c.

Solatoprimus

Small S. demissa

" athyris

Fav. placenta (?)

Sp. truncatus

Small Pentamerella

A. petosqua type

Pholidostrophia

Cyrtina hembiltonensis

C. alpenensis

This forms the lower River Terrace

The second & next higher terrace about 300 yards west of this river is composed of 1 foot blue limestone at base followed by about 3' of coarse blue shale with Strophodonts and C. alpenensis. This is followed by 1 1/2 - 2' of bluish, thin bedded ls. There are not more than 5' of shale (?) intervening between

29

The lowest bed here + the top of
 the limestone of the first terrace.
 The 2' ls is followed by 15" of
 shale and this by about 2' ls.
 The last ls. has *Cylindrophylloids* +
colonial Cystiphyllum.

ls	2'
sh	15"
ls	2'
sh	3'
ls	1'

July 26, '35
Grand Bend

1785

38

About 300 yards south + east.

(downstream) from bridge at Grand Bend:- blocks of limestone, shale and shaly limestone chiefly concentrated at the base of the bank, but also scattered through the clayey soil (till) of the steep bank. There are blocks abounding in bygonia, some ^{especially} blocks, ^{studied}, ones having the lithology of the Alpena ls. The shaly blocks with bygonia + crinoids suggest the Thunder Bay. The *C. coronatus* + *S. granulosa* remind of the lower Thunder Bay. This is true of *Cyclonaria* too which was found in matrix like the Thunder Bay.

Over
Send Mrs. Southworth
picture of Museum +
Mr. S. the yearbook

I would attribute the freshness and lack of stain on the exotic blocks as due to being entombed in the ice while transported and to being encased in the clayey till which would effectively protect them from wear.

A S. ringuei is in Mr. Southworth's collection, which was picked up in the drift. Found in N. branch of Thomas north of London by W. H. H. J. What appeared to be blocks of the same material appeared downstream from the bridge, between that structure and the lake.

July 26, '35

1786

31

Commander Charles Finleys.
About 5 miles NW of Ghedford.
The Commanders house and
the fields about are underlain
by the hard shelly, nodular,
shaly limestone ^{1 1/2' thick} of the upper
Widder beds, the same as
exposed at the small quarry
just over the railroad tracks
east of Ghedford. Just N
of the Commanders house
is a small run which
may be followed east
deep into his fields. For
more than 1/4 mile down-
stream the upper shelly,
hard bed is exposed. It
contains *Ceratopora*, sp.
Concavaria, *Arthrocauthu*
stems, sp. numerous.

32

Atypis, etc. Further down-stream the middle shaly beds of the Widdow are exposed. These abound in *Cyrtina*, sp. *micronatus* *Hedfordensis*, *Ceratopora*. Rarer are *Chironella*, *Cranidia*, *Leiorhynchus* and a few other shells.

Send Mr. Southworth Bryant's description of my *Aspidichthys*.
Send Mr. S. pictures of *Eleutherozoon*.

Send Mr. S. modern *Leda* or *Goldia*; *Sphaerocystites*; sharks teeth;
Mount *Spinifers* as pins for S's.

33

July 28

1788

According to Mr. Southworth the Marsh's Mill locality should be known as Hungry Hollow. The coarse-ribbed, new *Strophodontia* is from the coral zone.

Jones Mill and Fourth Hill

These may be reached by going north on the Thedford road 1.8 - 2 miles and turning east into the farm.

On the farm property behind the buildings is a shallow valley which can be followed down to a fall over the upper beds of the Widder which are here very thick. The ledge forming the falls

34

is in two layers, the lower one about 2' and the upper one $3\frac{1}{2}$ -4'. These are the same as the uppermost hard beds at the Rock Glen but are better exposed. ~~The Encinal bed forms a ledge some 20-25' below the top of.~~ Above the hard layer are fully 4 feet of blue Calcareous, brittle shales. Are these the base of the Petrolia?

The Encinal bed forms a ledge some 20-25' below the top of the falls. About 3' below the top of the Encinal is a limy layer in contact with the soft Arkona shales which shows beautiful ropeymark-

35 rings or fucoids.

If the gully is followed downstream to the Aux Sables River, the Growth Mill locality can be reached. This is a meander scar on the left side of the river going downstream about $\frac{1}{4}$ mile from the gully.

Here fossils from the Arkona, Coral bed and Widder are all mixed together.

Aceroularia heads are common at the side of the cut nearest the Jones Mill gully. Many of the heads are badly silicified but this is not true of the associated corals from the coral bed which are abundant about the locality.

36

The concentration of the *Aceroularia* suggests the source to be close at hand, probably from the coral bed, but the strong silicification indicates a long period of exposure. These *Aceroularia* heads may be from the drift and deposited on the river bank prior to the corals from the coral bed.

Mrs. Southworth found an *Aceroularia* on lot 8, which must have been a drift piece.

Tropidoleptus is common in the Encinal at Marsh's Mills.

37 Told Mrs. S. I would
identify specimens, sending
all back but marking
ones ~~she~~ would like to
keep.

Look up any illustrated
papers for Mrs. S. Lives
of Geologists

June 28

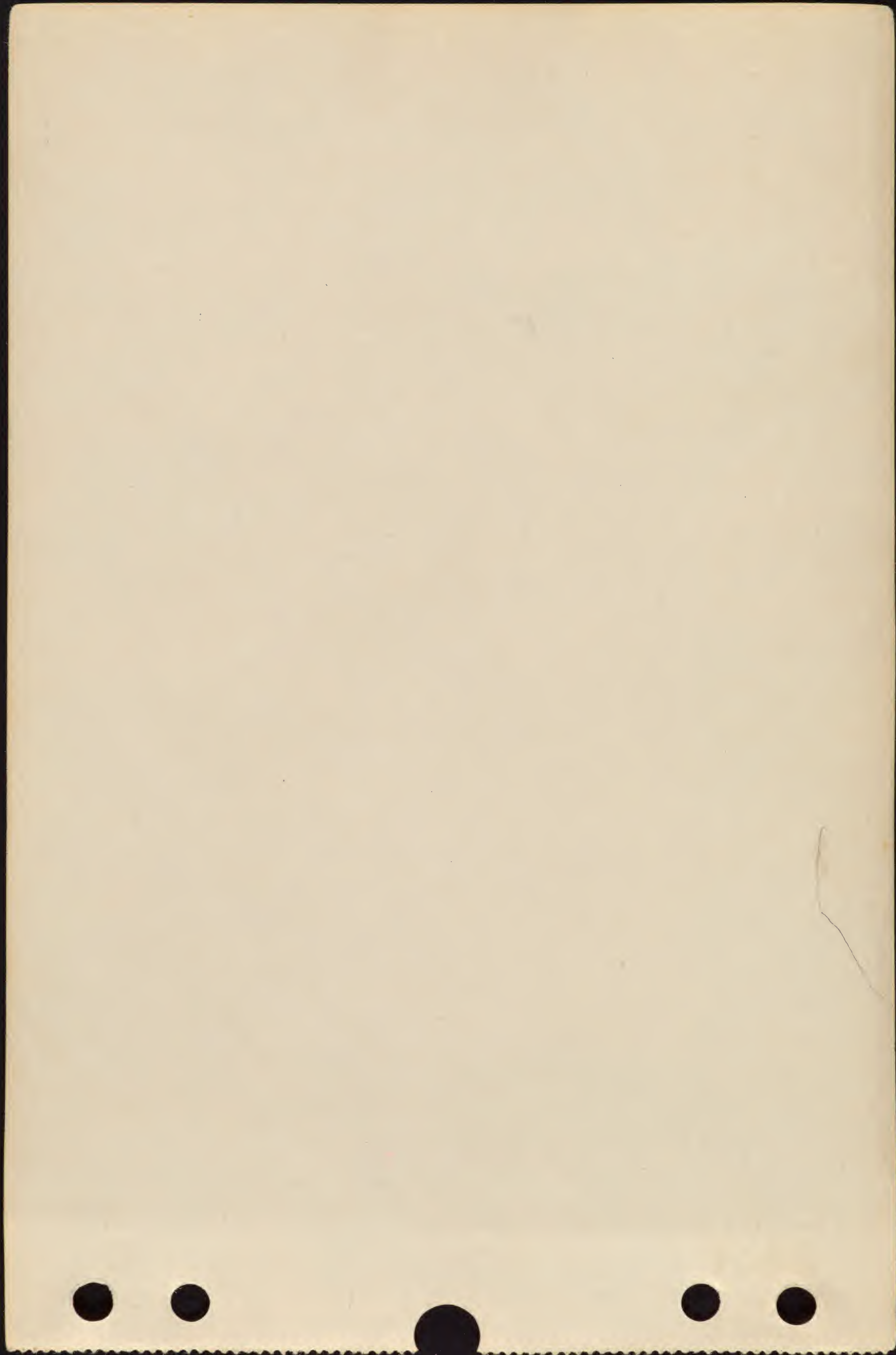
1935-1793

38

Linwood Quarry on route 61,
SW of Davenport. Pit of Linwood
Cement Co.

Cedar Valley { Coralville
 { Littleton
 { Linwood

~~Q~~
Davenport (Little ls)
Spring Grove ls
Kamwood sh
Otis (Little ls) 20'
Coggan 20'
Dil.



39

June 28
Linwood Qy.

1794

A = About 40' of massive dark and light lithographic to sub-lithographic limestone, some layers highly bituminous, others strongly brecciated

B = Smooth textured brownish gray limestone weathering rusty brown on the surfaces. No fossils seen

14' + F C = Sub-lithographic, light gray limestone without fossils. The lower contact may be unconformable and the upper one certainly is.

~~Bed~~ Beds A-C belong to the Wapsipinicon or lower Davenport limestone. Bed D. initiates the Cedar Valley.

16' E D - Initial stage of the Cedar Valley or Atappa Independence zone. Hard massive, heavy-bedded, fine-grained fossiliferous limestone. This rock is readily separated from that below by the presence of fossils. This is the bed from which *Hypothyris* has been taken. The lower 10 or 12 inches contain pebbles of the beds below.

undational

Linwood

7' D

3' C

22" B

A²

40' A

A¹

A¹ - non-brecciated dark grey sub-lithographic ls. = Spring Grove
A² - is lighter & often brecciated

Lithostrom

Wapsipinicon
lower Davenport

22 1/2'

1795

40

E. Shaly limestone containing many fossils; *Strophodontia halli*, *Schizophoria iowensis*, *Atrypa bellula* (this names the zone), *Cyrtina umbonata*. This is the old Hamilton shale.

1

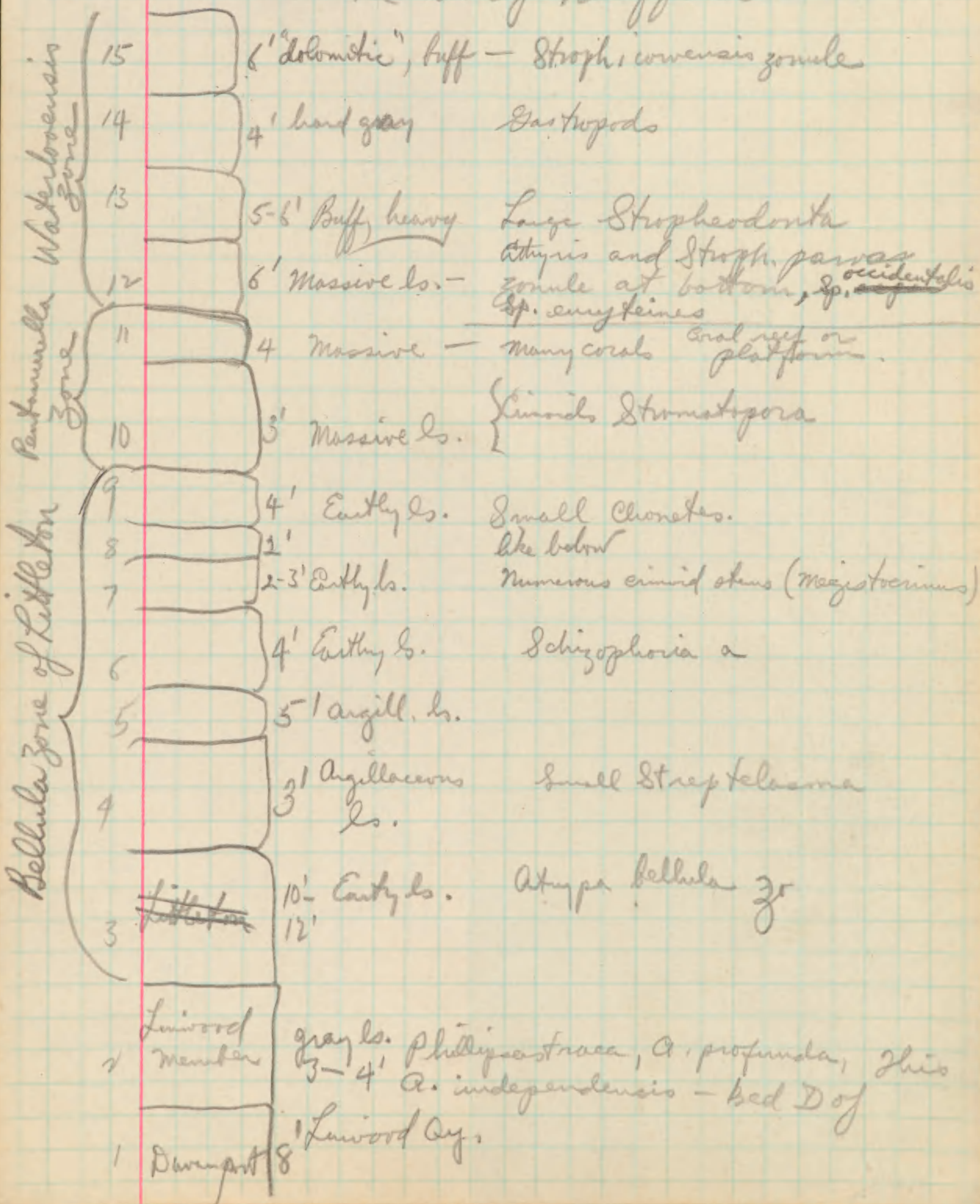
F - Mostly calcareous shale with few fossils.
E and F are Littleton members.

41

Buffalo Qy

1796

Section supplied by
M. A. Gairns
A little W. of Buffalo



42

2nd Big Creek S. of Buffalo
150 yds above highway Pl. 1797

3.7 miles S of W. of Buffalo

Top of Devonian

5-6' Coralville - dolomitized limestone
with altered *Stromatopora* and
with *Cranaena* at the base

End of *A. waterlooensis* zone

Heavy
massive
dolomitized
limestone

8' *Spiner capax*. (type locality)

Dolomitized
ls.

4' Finer
bedded
than
below

Shaly
ls

3-4'

Stroph. iowensis zone

43

The *Eatonia gregaria* of Belanski
suggests Leiorhynchus 1798

Paraphorhynchus elegans Belanski
suggests *Hypothyridina*

Borrow State Cy. cephalopods which
suggest lower Alpena (Whitefish Bay).

McLellan's clearing for *Goniatites*

See *Cyrtoceras dictyon* white-like.
Campbell's at Falls of Ohio. Cyrtoceroid
with beautiful ornamentation.

Heliophyllum confluence = *Billingsastrea*

Stop at 1 mi. NE. of
Laurens, N. Y.

Prism for reversing pages

~~Send out Cat Types Amer. Mus.~~

June 29.

1799

44 1.3 miles W of Middle Amman, Ia

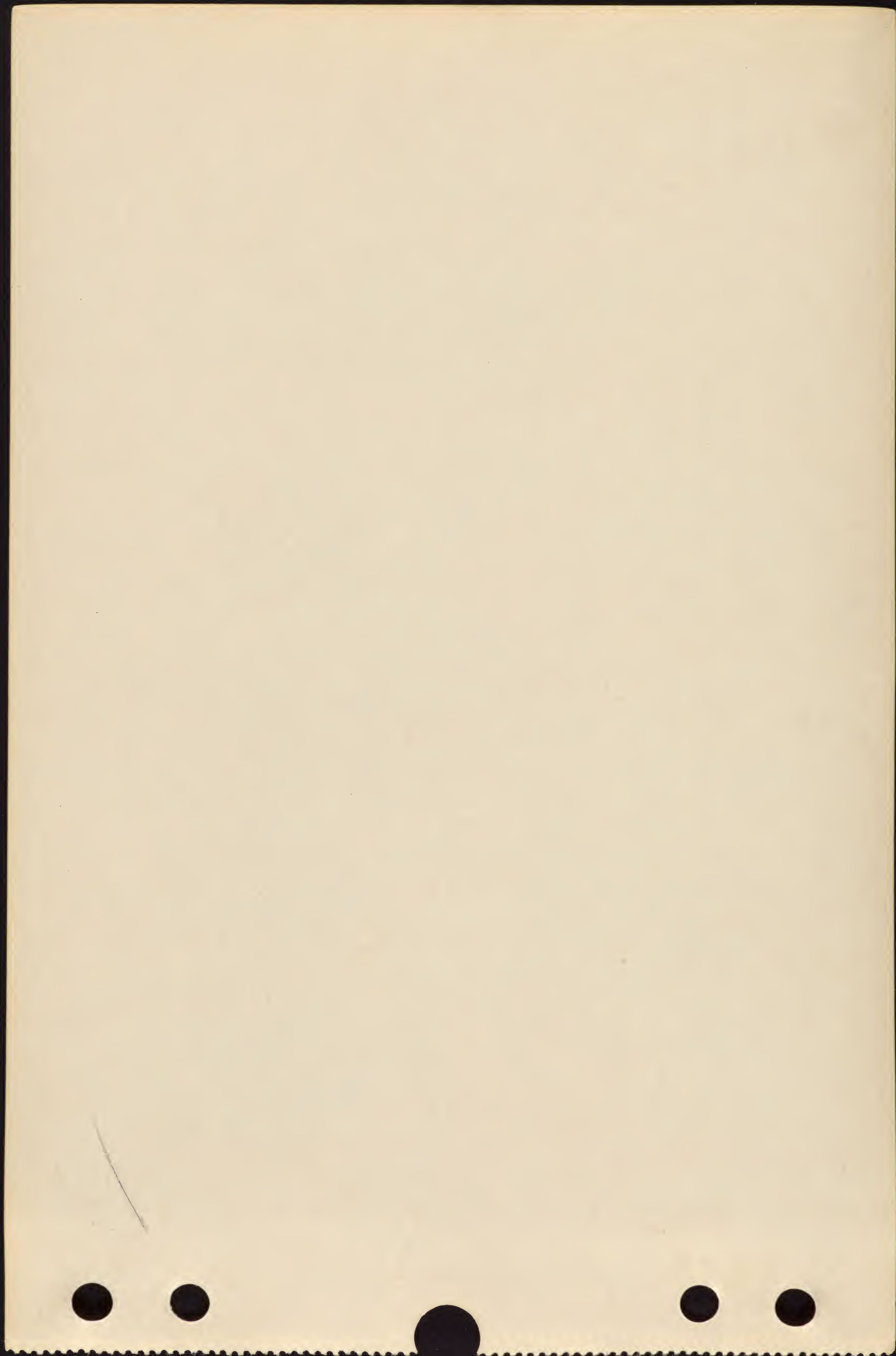
June 30

Iowa City

End of Iowa Ave, bridge

About 13 feet of heavy-bedded lithologic limestone containing a large snail (*Plumotomaria isaacsi*) and *Spirifer urbaneus*. About 4' from the top of the exposure is a zone of *eldiostroma*. This is almost the top of the Cedar Valley. At places the beds have been brecciated. There is a second zone of *eldiostroma* at the base of the section.

See Johnson Co report for full thickness of Coralville. Well seen in quarry behind (West) of fine arts Building.



1800

45

June 30'
Sec 30, Newport Twp., Johnson Co.
80°N-6°W

A - *Atthisia vittata* and *Sp. asper*
zone of the Littleton-Rathen
soft shaly limestone

B - *Pentamerella* zone of the
Littleton containing. Mostly
hard shaly limestone abounding
in corals.

10' B.

6' A

11
2
1

June 30²

1801

46

West edge of Solon village on
road to Cedar Rapids

A = rather shaly nodular limestone
about 14 1/2', weathering to ash gray.

Schizophoria meeki

Sp. rowensis

Stroph. subdennissa

Sypidula occidentalis, + *conius*

Atrypa independencis (zone)

A. occidentalis

Cranidia thomas

Productella belantiskii

Stropheodonta costata

Billingsastraea

Accrularia

profunda

zone

5'+

Atrypa

independ

encis

zone

A

14 1/2'

B. more solid shaly limestone
with *Accrularia profunda*.

All part of the Luniwood
member
2 pictures

June 30th

1802

47 NW Sec 26 (Big Grove) - 81N - 6W.

30-35' of hard bluish limestone,
a little shaly. Brachiopods are
at the base. Belongs to Bellula
zone. Sp. Cedarensis. Benton Co.

June 30th

St. 2.

~~Wally Bellula zone~~

All quarried away
no St. 2 left

State Quarry beds.

About 10-12' of Brachiopod breccia,
gray, thin bedded limestone abounding
in Pugnoides, small Atrypa etc.
These beds fill erosion channels
in the Cedar Valley and overlie
different stages. The beds here
overly the Bellula zone

June 30⁵

1803

48

By one mile N of Ely on road
from Blou - Cedar Rapids.
Shows basal Cedar Valley over-
lying Davenport with pebbles
of the latter in the Cedar
Valley. *A. independensis* is
abundant. *Gypidula conica*,
Schiz. meeki.

July 1804

Qy in mid. sec 33, 86 N-8W, Grant Tn.

49

Small qy. showing top of independ-
ent zone of Lurwood about 5' and
some 5-9' of profunda zone. Upper
3' of this zone here contains abundance
of newbernia. Bellingsastraea common.
Fracture hard buff ls. with much
X in calcite in cavities + seams.

July 1st.

2 miles east of Central City

About 30' of Otis, thin bedded,
blocky fracturing when weathered.
The beds run one inch to three inches.
Lower beds massive, a foot or
more thick.

July 1st

About 1 $\frac{3}{4}$ miles E of Central City on
creek. Hard heavy-bedded
massive dolomite, buff, finely granular
or like table salt in texture. Many cavities.
The Silurian is probably lower. Coggan.

July 1st

See Norton Lign
SE $\frac{1}{4}$ sec 28, Jackson Tn., 86 N-
6 W., $\frac{1}{4}$ NW of Central City. Along
Wapsipiricon R.

Otis

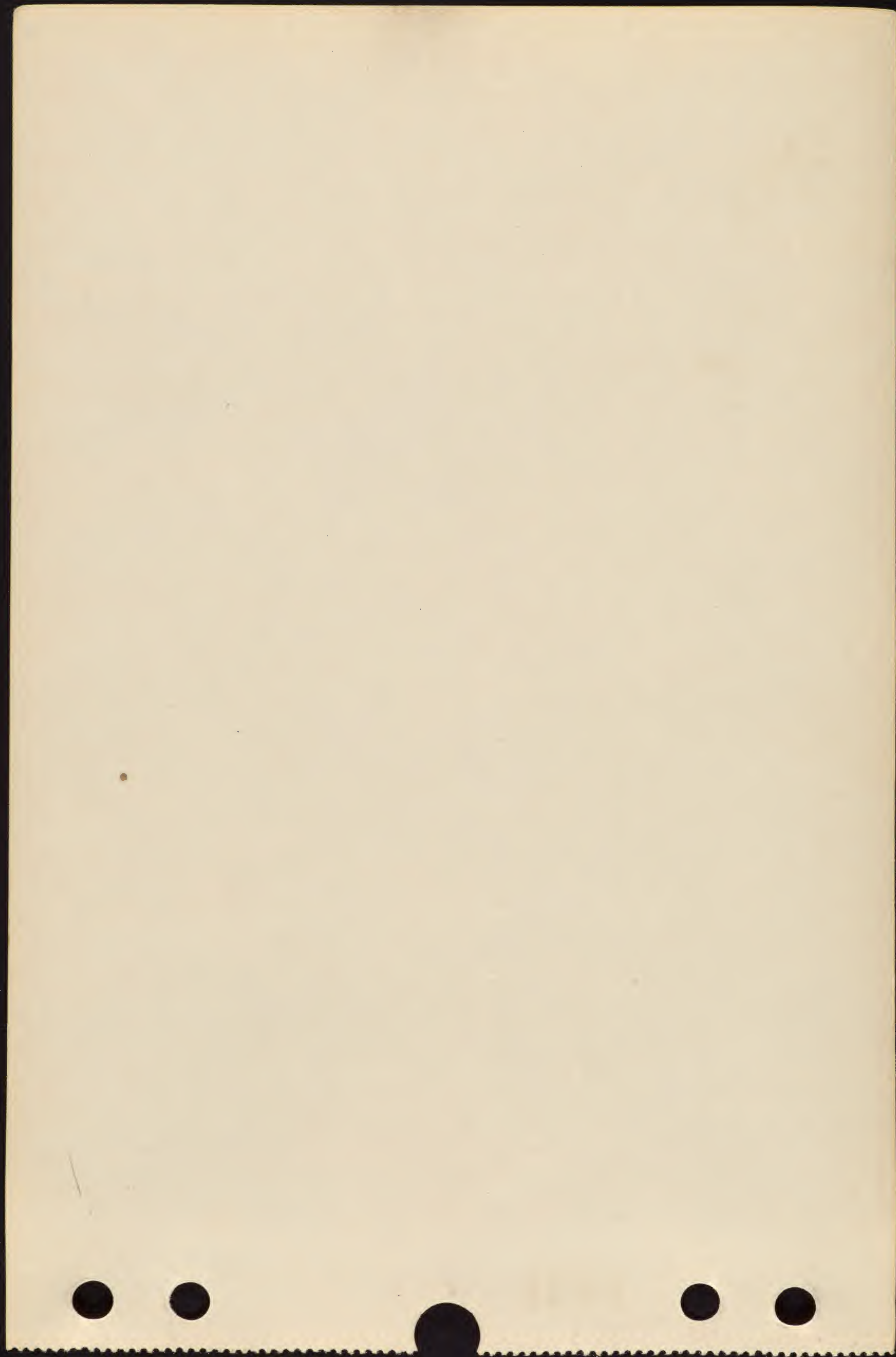
20' B

A - About 15' of fine-grained
dolomite, yellow gray or buff.
Contains innumerable impressions
of a small Spinifer, Gonocaulum.
Suggests some part of the
Detroit River series.

Coggan

15' A

B - bedded, hard Otis.



July 14 1895

50

Section on Cludian Creek, back of
Country Club in Kenwood Park, Cedar
Rapids

A - Sub-lithographic ls. brachiopods
at top. 12'. Otis

Davenport

12' D

B - Bluish shaly ls. + sh. Type
section of Kenwood sh.

Spring
Grove

18' C

C - ls. sub-dolomitic, thin-
bedded at top, massive at base
Spring Grove

Kenwood

20' B

D - Lithographic brecciated ls.
lower surfaces irregular
Davenport ls.

Otis

12' A.

This is the Kenwood section
of Norton in Linn Co. report.
Norton said Kenwood

correlated with Independence sh.
These are all divisions of the
Wapsipinicon

July 2,

1806

51 74 100 yds E. of bridge over Cedar River on Island - shellbearing ls.

10' Waterhousei zone

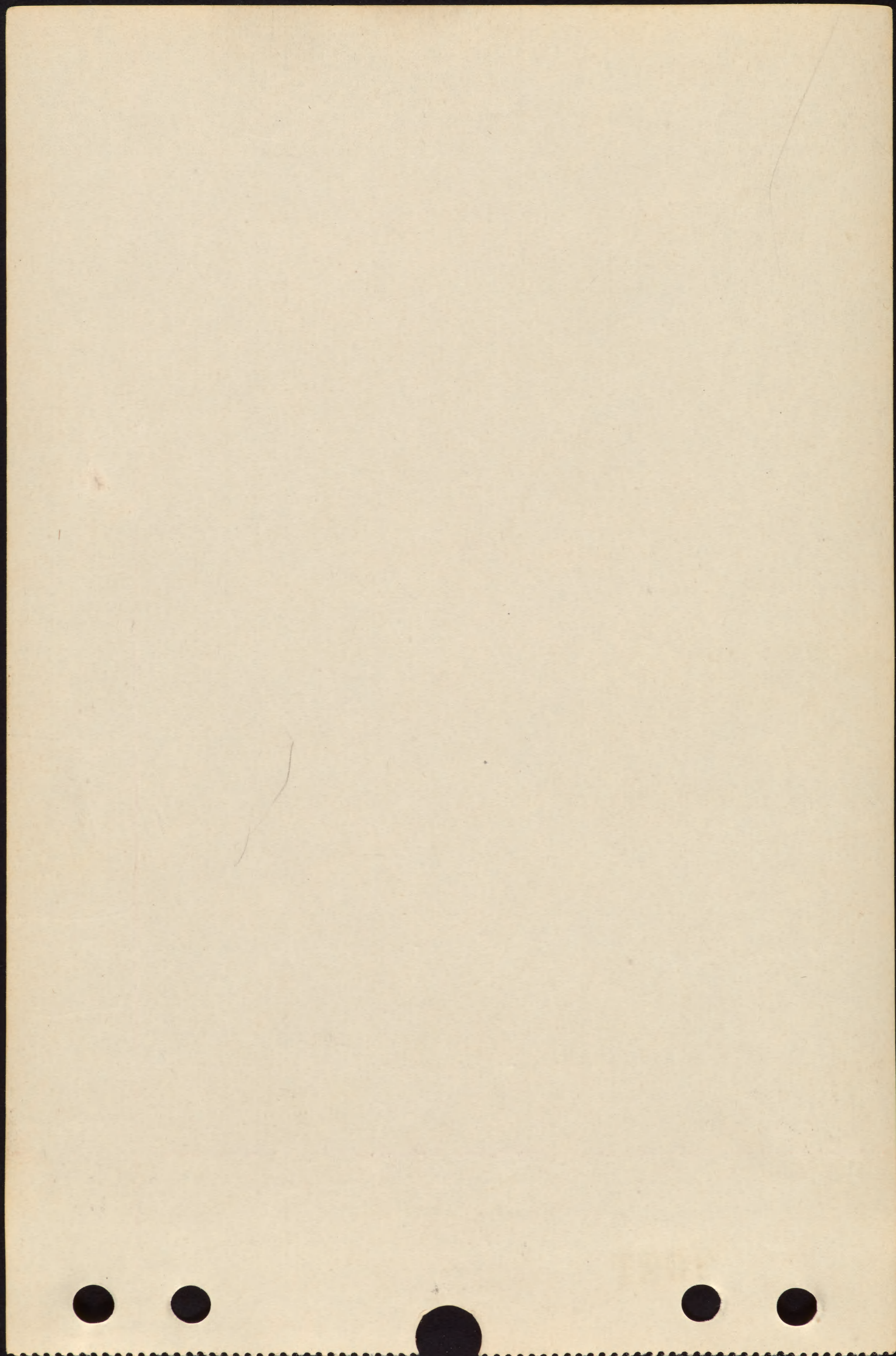
6' Pentamerella zone { Many corals.
Ocellularia
davidsoni

11' 17' bellula zone bluish compact ls, weathering shaly
Gonphoceras zone at base*

16' upper Linwood (Profunda zone)
Gastropod a. Billingsastraea

* There is also a cephalopod (Gonphoceras zone) at the base of the Linwood.
all fractured ls.

804



1808

Some Triassic beds of Vassar

52

Qy on Nichols Farm.
near Vinton

About 35' of brecciated ls.
of the *independensis* zone
abounding in the sp. *independensis*
Near top of Qy *Neuberia* common
2'-3' of *Profunda* zone at top of
Qy.

Rcut

A - about 6 feet of brecciated
Davenport

Lignwood

5-10' C

B - rubbly ~~ls.~~ limestone
breccia with knobs and cobble-sized
pieces of ls.

Rubbly
brecciated

10-15' B

C - bedded ls. of the *Gyrogonia*
beds of the basal Lignwood

Davenport

6' A

Over the bank and in the
river bank the Spring
Grove is exposed below
the Davenport.

Spring
Grove

In the breccia (B) occur
worn pebbles of buff ls.
containing *Albugo* *independensis*
This suggests that the breccia
bed (B) is a basal conglomerate
of the Cedar Valley. Contains
also quartz pebbles 2" across.

1809

53 Bed B is entirely a limestone
breccia not unlike the ones
found in Quebec.

1810

54

July 3

Prine Creek NW cor sec 28, Liberty Twp,
T 88 N - R 8 W., near Quasqueton, Ill.

In stream is exposed horizontal independence zone for some 75-100 yards. Then comes steeply dipping beds containing *Newberria* & corals. On top of these and surrounding the loose blocks is soft sh with *Dorvillea* belonging to the Independence sh. This shale contains shale pebbles & broken fragments of ls. About a rod upstream from the dipping beds is flat independence again about 5' vertically above the dipping exposure and 15' down-stream the flat-lying *Newberria* beds are exposed. It suggests a cave-in of the *Newberria* beds. Stainbrook thinks, on the other hand, the dipping beds are thrust ed lower beds of the *Syroceras* zone of the independence. ~~This zone carries~~ The *Newberria* bed carry *Bilings* & *Stroala*.

55

River level

Poor Farm

1811

Chertwood
Jubais

Devonport
Buckin

works to the
defunct valley
Cedar
Kremer

Quartz
Sh.

Defunct Devonport

Strophomena

1812

56

Volga River at Eagle Point
Sec 31, 9³N-8W, Westfield Twp.

Shows at base a few feet 3'
of Spring Grove platy limestone
followed by about 10' or less of
Davenport breccia. Then comes
a heavy bed of breccia 10-12'
cemented by limy shale & shaly
ls. Contains pebbles of the
Davenport. This is followed
by about 50' of Cedar Valley,
containing the Pinewood, and some
of the Littleton

Eagle Point section of Fayette
Co Report.

July 4 1813

Waterlovensis zone suggests
Partridge Pt.

57

Section at dam on
Wapigwicon River at Littleton

A = Profunda zone exposed
just above the water

B = Bellula zone - here
reduced to 2' feet. Carries
large curved cephalopods

C. Pentamerella zone -
abounds in A. Davidsoni

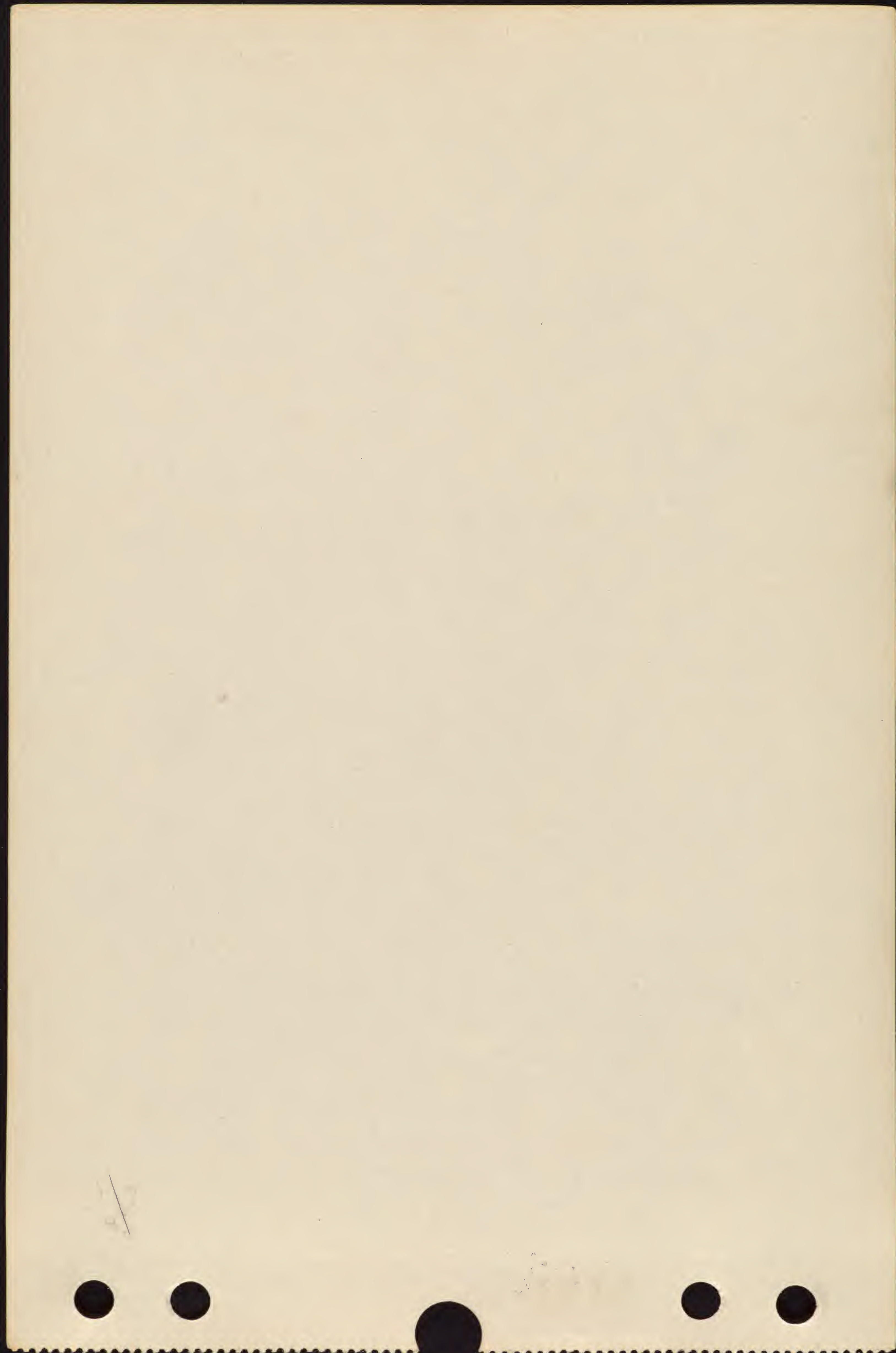
D - Waterlovensis zone

Water-
lovensis 12' D

Pentamerella 4' C

Bellula 2' B

Profunda 3' A



1814

July 4.

58

Saw two sections of Independence shale on Linn Creek. In each case ~~the~~ the lower contact of the shale was not visible. Lateral contacts showed the profunda zone. Every section we have seen ^{except} the type quarry at Independence suggests that the Independence shale overlies the Cedar Valley. The Poor farm was the only section showing Davenport in possible contact with the shale and here it seemed to contact laterally with Cedar Valley breccia. In no instance was regularly bedded shale seen.

(60)

July 18, 1936 1815

Exposure of Upper Widdow
about $\frac{3}{4}$ mile east of
Oppenwash beach.

A.A. Soft limy shale with
Athyris, *Charionella*, *Pholidostrophia*
S. denissa. Thickness unknown

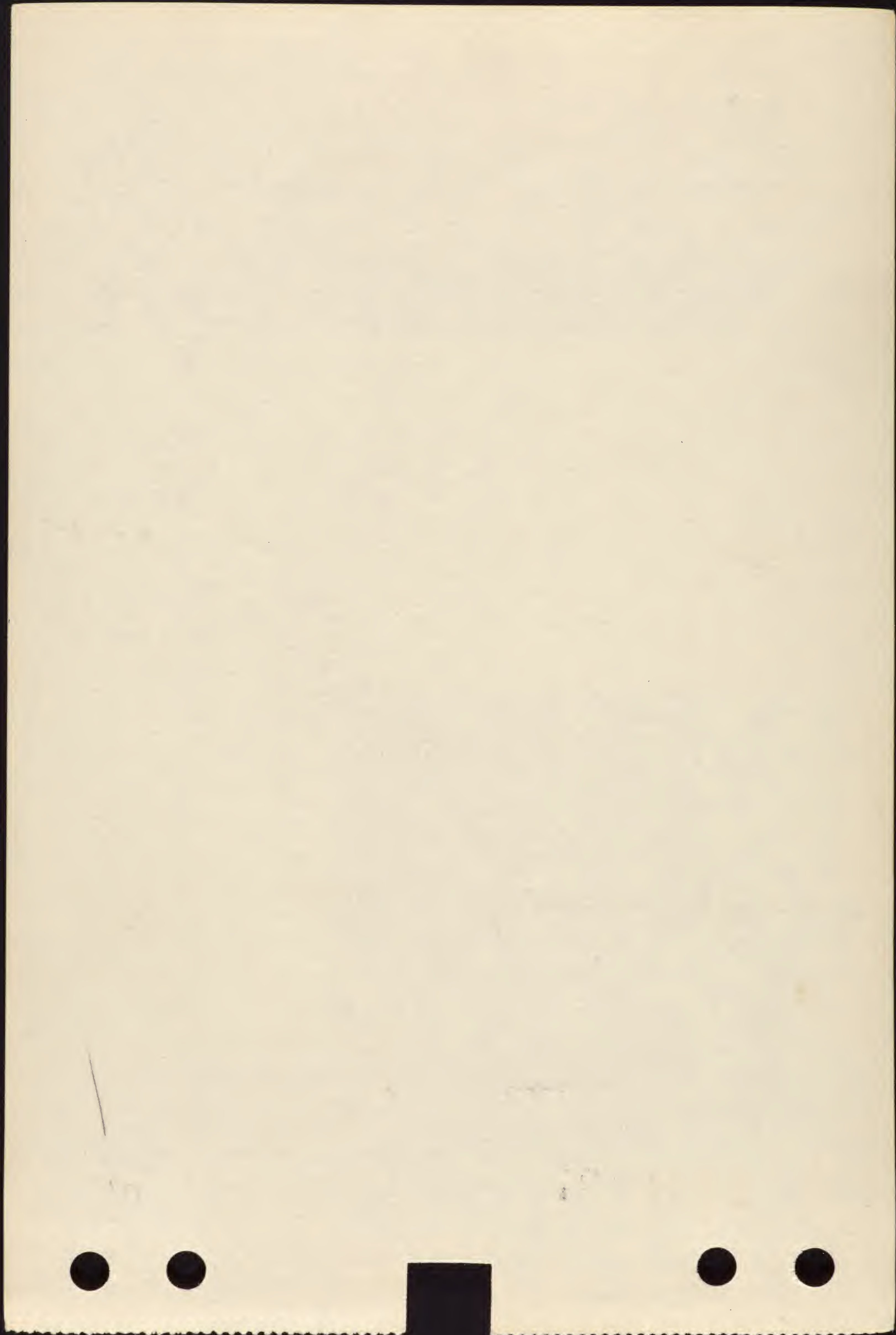
A. Hard, brittle shaly ls.

6"	E
9"	D
7-9"	C
5-8"	B
4"-5"	A
	AA

B. Contains *Pholidostrophia*,
Sp. Thedfordensis

C. Abundance of *S. denissa*,
S. Thedfordensis, *Athyris*. Small
amount of chert, large *Orthoceras*.

This is the upper Widdow, the
same heavy bed exposed at
the top of Rock Glen, Jones Mill,
along the R.R. and at the bend
about 1 mile east of Thedford



(6b)

1816

D. Large *S. concava*, *S. demissa*,
Athyris, *Brizozoa*, large *Cephalopods*
Contains much ~~dark~~ brown
chert.

E. 6" brittle brown weathering ls.
with *S. Redfordensis*, *S. demissa*,
Very little chert.

The limestone as a whole
weathers brownish both on
surface and inside. This
exposure is only $\frac{3}{4}$ mile
east of the bed at Appewash
Beach. The dip on the west
edge of the exposure is
rather sharp (2° - 4°), which
might mean a considerable
thickness of rock, ~~the~~ *Petrolia*,
between the two.

(To W)

9586

9571

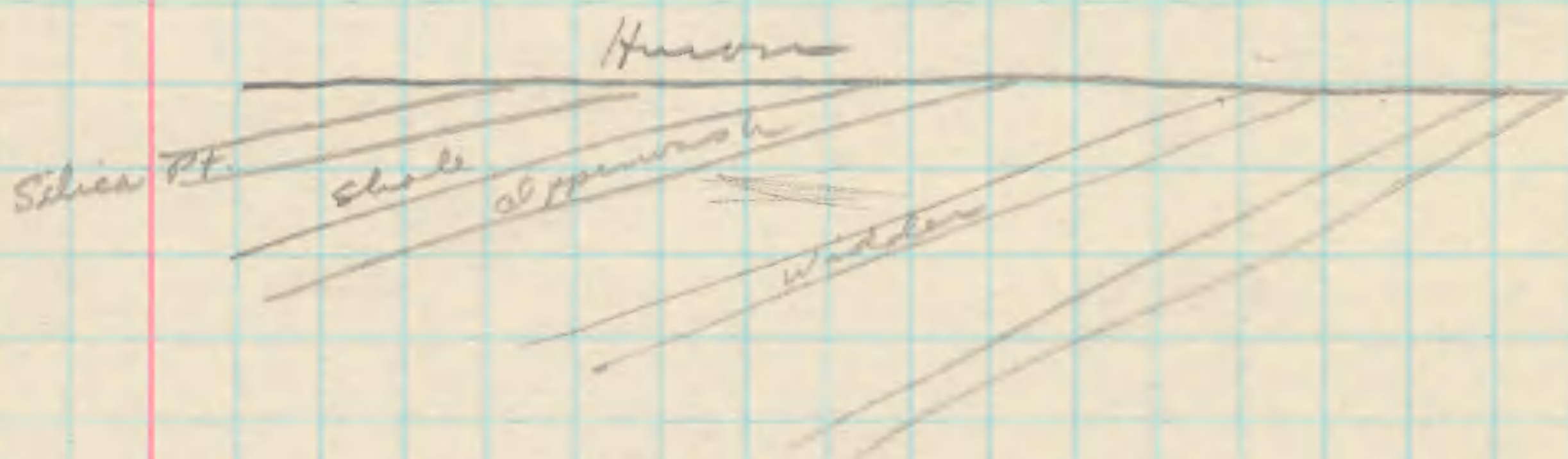
1.6

1817

(62)

Silica point $2\frac{3}{4}$ miles West of Apperwash exposure.

About 2' of limestone with dark gray to black flint, rusty brown on surface. Limestone with *Chonetes (vicina)*, *L. demissa*. Below the ls. is blue shale. (sample taken). This bed might represent Wanabach.



About ~~1~~ 2 miles SW of West bluff of Kettle Point, the Silica Point section appears again, 22" thick. The bottom of the bed contains the channel fillings with pyrite. In the lower part were found *Tropidoleptus*, *L. granulosa*, *L. perplana*.

In the upper part of the limestone *C. vicina* is abundant with *Homaloxotus*, etc.

The black shale (Huron) lies directly on the Silica Pt. ls. and is in a low basin

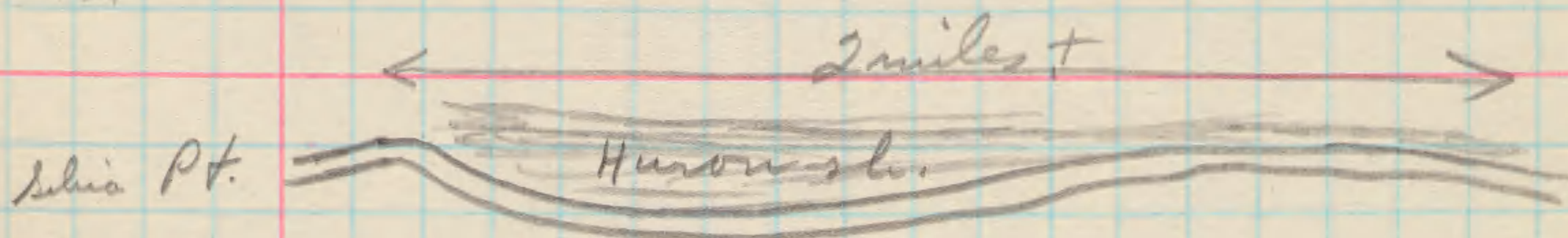
1 1/2 mi. N of
Shawano Creek



(63)

of the Silica Pt.

1818



"Shawanaw" Creek lies ~~just~~ SW of the outcrops. The outcrops is about $\frac{2}{3}$ the distance from Kettle Pt. to Shawanaw Creek. Flint indicates unconformity.

Ippeewash - Stony Pt.

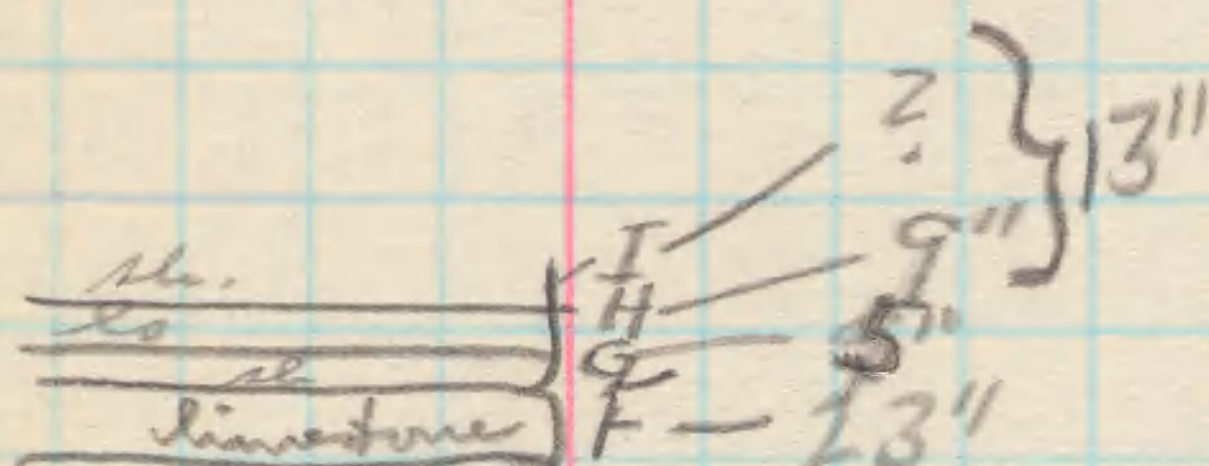
Upper beds contain a small *Strophodontia (plicata)* suggestive of Michigan.

64

Silica, Ohio

1819

A -



Silica sh. E

B - Fossils seen in places
Large Schizophoria, Tropidoleptus n.

6" limestone D

Blue sh. C

Blue ls. B

C. Contains many Leptostrophia
several of them small.

Columbus A

D. Contains Lingulites, Cornellites
etc.

E. The Silica shale.

F. Large Leptostrophia, common
in the hard earthy limestone

G. between the heavy ls
I and the thinner bed H.
occurs a blue shale abounding

1820

(65)

in *Rhipidomella* and *Strophodont*
Pholidostrophia, sp. numeratus.

Dip on $84\frac{1}{2}^{\circ}$ N 75° W.

H. - Thin limestone 9 inches thick
Ambocoelia

L. Abounds in *Ambocoelia*
and *Leiorhynchus* is rare.

H & L go together. The upper 4" is shaly and the *Ambocoelia* weathers out

Correct reading

compass set

$84\frac{1}{2}^{\circ}$ N

(66.)

July 20th.

1821

10 - Mile Creek Section

Section is located on 10 mile Creek just below or south of the Medusa Cement plant. The section runs west of the highway bridge. First rock exposed is about 75 to 100 yds west of bridge. This is upper part of Columbus limestone showing the *C. coronatus* beds ~~and~~ definitely and probably also the blue beds, although I did not definitely see them. After the Columbus exposures there is a long covered interval showing no exposures in the stream-bed. Along the bank there is much blue clay which was dredged up. I judge there is an eighth of a mile of the blue clay on covered interval. ~~The~~

The first ls exposed is a hard blue limestone abounding in *Leiorhynchus*. From here for another eighth of a mile exposures are nearly continuous. The rock dips at a low angle, I guess about 4° to the west. and in all

1822

(67)

between 20 and 30 feet of
limestones are exposed. Some
of the stone contains white
chert and most of it is
greatly dolomitized, fossils
occurring as impressions.
Fossils are hard to get. In
addition to Stauffer's list we
found Cyclonema, Reticularia,

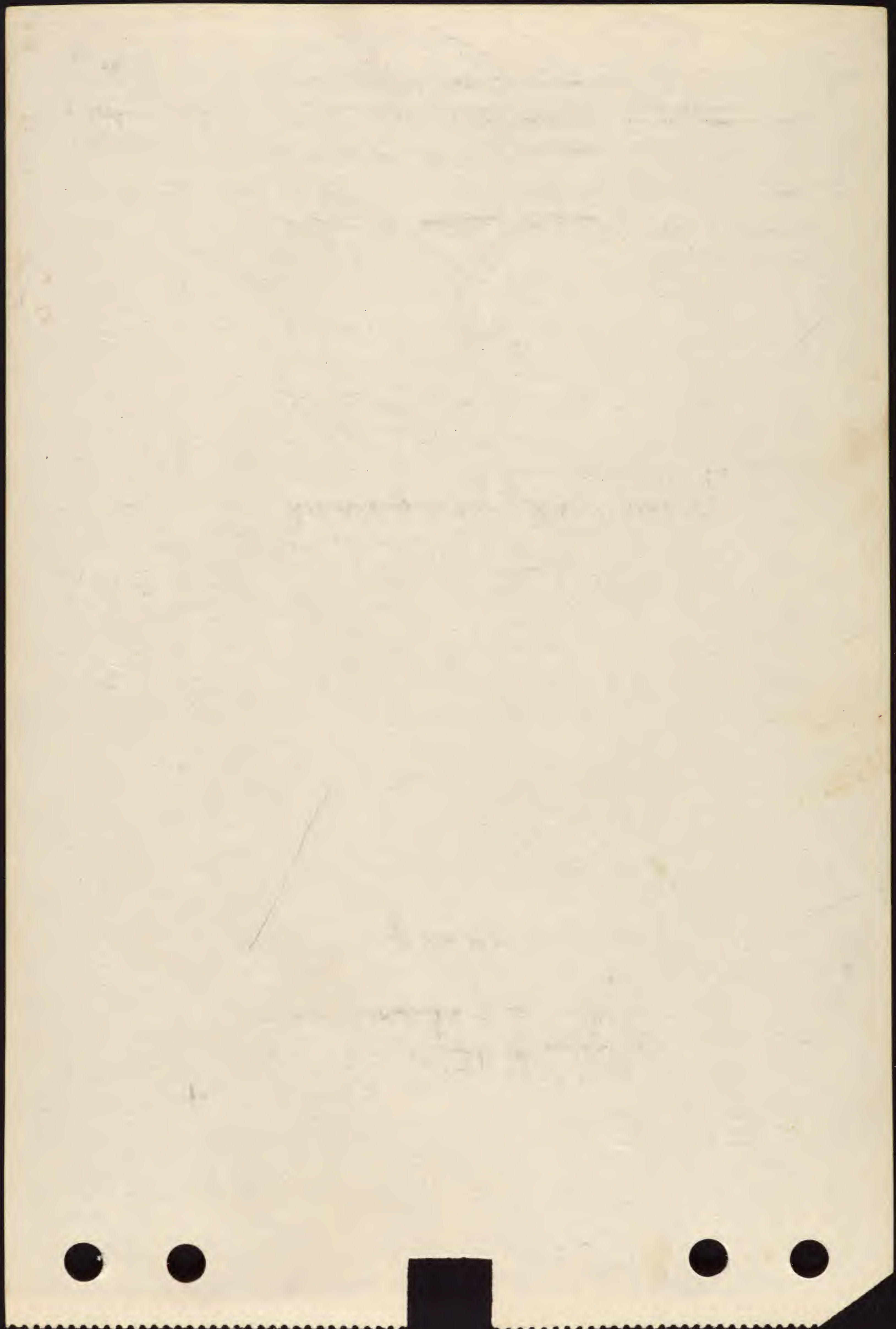
There seems no doubt in
my mind that these beds
belong to the Centerville
horizon, but I doubt if the
sp. beatus occurred with
the Liorhynchus, my guess is
that it should come above it.
Mr. C. found a large
Liorhynchus loose.

1823

68 Page 1

Distances
Up Dip by PaceSept 7, 1936
10 Mile Creek, Silica, Ohio
Strike N 75° E / Dip S 15° E 6°

145'	K	A - First outcrop going upstream from bridge Buff colored dolomite filled with casts of crinoid stem segments
30'	J	
25'	I	
30'	H	B - Brown granular ls. no fossils seen
150'	H	
8'	G	C - Brownish gray highly fossiliferous granular ls. Large <i>Conocardium</i> cf. <i>trigonale</i> , <i>Schonetes coronatus</i> , <i>Tropidoleptus cuneatus</i> , Large <i>Leptostrophia</i> cf. <i>perplana</i> , small <i>Chonetes</i> , <i>Productella</i> sp., <i>Platyceras</i> large sp., <i>Strophodonts</i> cf. <i>concaaba</i> , small <i>Strophodonts</i> , <i>Atrypa</i> sp., <i>Conocardium</i> like pelecypod, <i>Pholidostrophia</i> sp., <i>Tropostoma</i> , <i>Finestellidae</i> , <i>Leiorhynchus</i> like one in beds above, <i>Mucrognathus</i> , <i>Gyp. corals</i>
130'	G	
20'	F	
800'	E	D - Gray granular limestone, a gray or more dense phase of C with the same fossils but more <i>Atrypa</i> & many <i>Mucronata</i> <i>Spirifer</i> like <i>Schizophoria</i> sp., <i>Spirifer</i> like <i>gregarius</i> but more corals
85'	D	
Blue bed V.		
130'	C	
100'	B	E - Covered interval - Material on bank was used to indicate Blue ls. Blue shale & siliceous shale of Silica quarry - Main part of the Phacops millers found in blue clay on bank
1160'	A	



1824

Page 2

Sept 7, 1936

69

10 Mile Creek, Silica, Ohio

F - Dense blue-gray fine grained limestone with many *Leiorhynchus* & other fossils - 25' interval in stream bed covered with loose blocks, none seen in place - *Leiorhynchus* *Obolites* small, *Strophodonta*, *Microspirifer*

G - 130' interval in stream bed of blocks of blue shaly ls. resembling Blue beds of Silica G. & blocks of *Leiorhynchus* beds scattered about - Blue shale on banks soft & full of pyrites, probably Silica Shale

Glacial
debris

G' - A number of scattered blocks of brownish buff granular ls. with ~~traces of~~ *Leiorhynchus*

H - Bluish gray siliceous ls. with cherty
H - modules

550'

H' - White chert

I - 25' grey dolomite

L

J - Siliceous grey ls. & chert

K - Dolomite buff colored with casts of crinoid stems

K' - 60' covered interval Blue Shale on banks

L - Dense purplish blue dolomitic ls.
To top of section where glacial striae are.
Strophodonta, coral & crinoid casts

60' K'

Yellow
stone

Land

some thin

Alpina

Barren

Devil's Gate =
Passage

Staring

marlinia

Near

Carbony

Bell

Staring

Partially made
RC
and Eifl.

Log. = Cont.

Str.

Elab.

Dunder = Marston

Sil

Abber
Eunio

Long Stone = Scholam

1825

(79)

Section 3/4 miles NW of
Bumbers Hill on Pike Creek.

A. Hard dolomite with abundant
chert.

B. 4-5 feet granular ls. the
lower 2 feet fine-grained
light yellow or cream,
very thin bedded. Upper
half more massive, harder
with more corals, varies from
green gray to white or yellow
See Kindle for list

Hamilton
4-5'

B.

Silurian
10'

A.

To reach this place take U.S. 31

to bridge over Pike Creek. Turn
left at bridge and follow
dirt road along creek to next
bridge over creek. Best exposures
are about 100 yds downstream
from bridge on N side creek.
The exposure is in Miami Co.

1826

(71)

Qy. of France Limestone Co.
at Kenneth about 4
miles West of Logansport.
Only Silurian seen.

Section 100-150^{yds.} downstream
from Georgetown bridge.

A - Sugary yellow limestone,
hard, heavy-bedded, discontinuous
laterally. Few fossils.

Granular
ls. varying
in hardness

B { 9' maximum B. Overlying the sugary
limestone is the Silurian is
finer-grained, earthy, brownish
or buff limestone with
many corals ^{Stromatopora} and a few
other fossils. Retenulonia,
Craneana, Atropa (fine-lined)

sugary ls. A

Silurian
10' ±
Platy dol.
Limestone

Sp. venustus (about 1' above Silurian
in fine-grained, hard limestone
This limestone for the lower
7' is hard but weathers
into small lumps, giving the
cliff face a blocky appearance

The upper 1-2' is thin-
bedded granular (coarsely) and
abounds in at least two
species of large Spirifer.
One of these, a Cyrtospirifer
must have been confused
by Leslie with Sp. acuminatus

72

Little Rock Creek near
confluence with Wabash River

81 paces upstream from bridge
appears first Devonian, below
is gray Silurian dolomite about
5' thick.

On top of Silurian is 20" of
blue granular limestone with
Spizher divanicatus (*venustus*)
Then follows 18" of thin-bedded
granular buff limestone with
Sp. granulosa and *Rhipidomella*.

~~81~~ brittle ls
7'?

covered

3' - Hard gray
limestone

18" *Sp. granulosa*

20" *Sp. venustus*

Sil 2.

On this are 3' of hard
gray massive fine grained
sandy limestone with fossils
hard to get. This measure
may be excessive owing to
dip upstream.

The rock is covered for a
short distance in the stream
then follows brittle shaly
limestone with *C. manitobensis*,
Leptostrophia, *Stropholonia*.

The lowest bed in this
section may actually be
Devonian but we could
not prove it.

73

Deer Creek about 1828
1/2 mile east of Delphi

Hard heavy-bedded dolomite
in bed of creek, about 3'
showing. On section gray or
brownish gray with *Sy.*
mucronatus, a small *Chonetes*
and *Pentaculites*.

France Co. Ky Section in Quarry 3 miles
east of Logansport on Highway
US 240

Cap coral
broken
14'

Strom.
15'
broken

Silurian
30' ±

A. Silurian on east wall
quarry 30' of brown or yellow
dolomite with *Halysites* and
Leptaena.

B. Hard, massive limestone,
a cemented mass of *Stromatopora*
club-shaped *Favosites* with
an occasional *Prismatophyllum*
I believe the Devonian
begins with this limestone.
Mud green clay with Stroms.

C. Jumbled mass of cap corals,
shells of *Stromatopora*, etc.
This layer is thin bedded and
more rotten than the
lower 15' bed. This is the

1829

(74)

bed that correlates with upper layers at Pipe Creek. Chnoids are abundant but poorly preserved. The whole structure is that of a reef below and coral plantation cemented by animal debris.

Kindle calls the Stromatopora bed a limestone bed with calcareous concretions.

Send Mr. Campbell Swanton
~~He is at~~ Chattanooga shale.

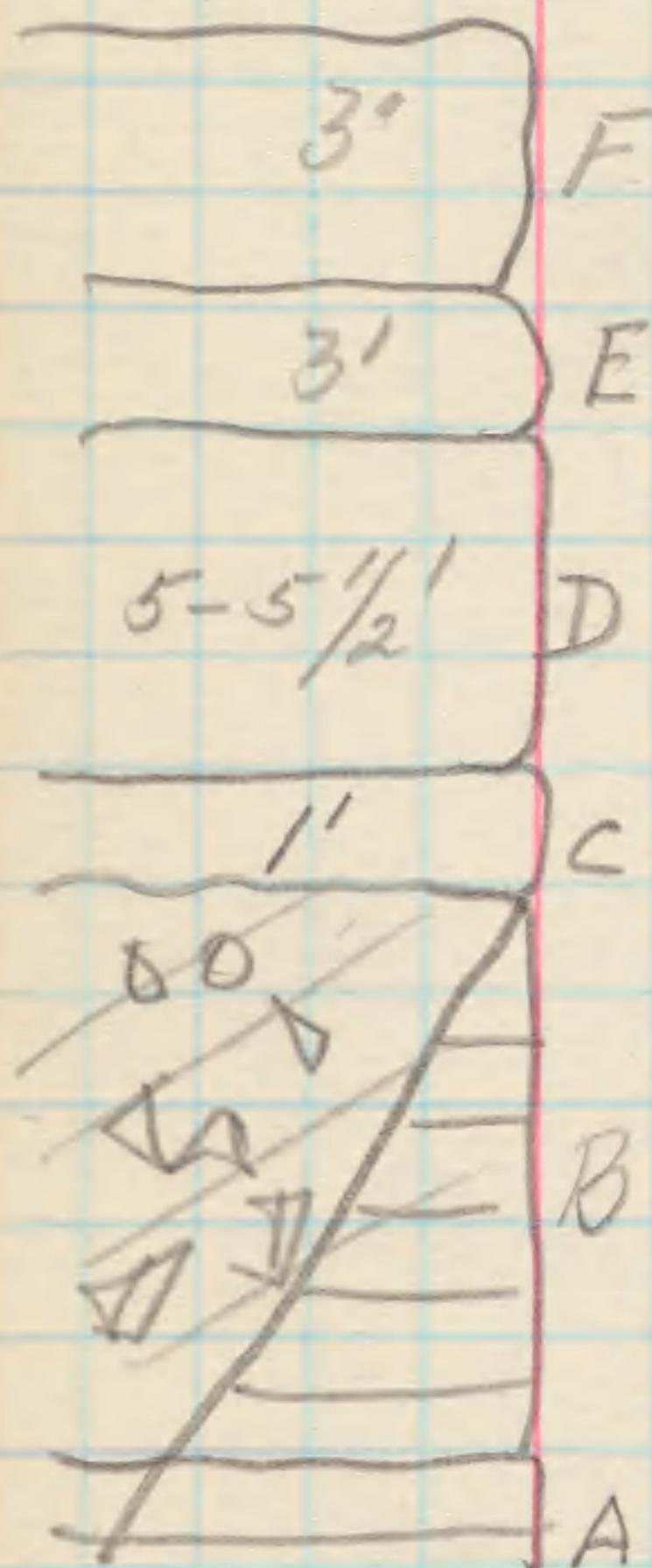
1830

July 24

75

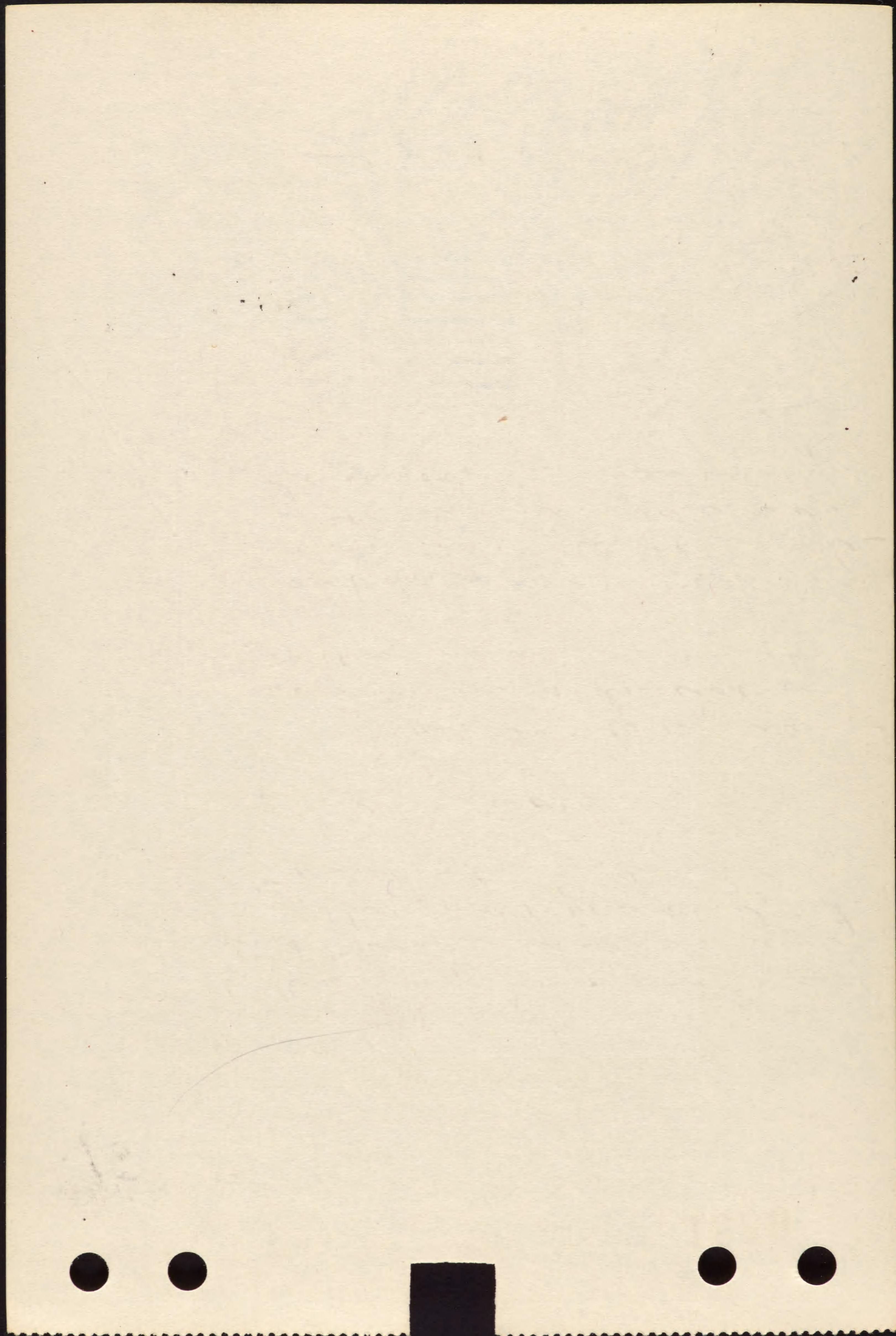
Section on Pipe Creek from bridge to dam at Falls.

A Just upstream from the bridge there is heavy-bedded (beds 3" thick) light gray dolomite with chonetes, Leptaecya. About 1'-2' under the bridge, here the dolomite dips to the north at a low angle.



B. Upstream to the dam the dolomite is brecciated and in heavy layers 1' or more thick. In places bedding is not clear. The whole dips at a low angle to the north. Over this the Devonian lies unconformably.

Traced downstream ~~has~~ a few rods the breccia becomes thinner bedded and flattens considerably. At the bend of the stream just below the bridge the Silurian is nearly horizontal and rather evenly bedded in layers up to 8" in thickness.



76

C. Hard sandy limestone containing *Pachystrophia*. Light yellowish in color. One foot thick, unconformable on B.

D. Hard, massive light gray fine-grained limestone abounding in *Stromatopora* and a few other corals. 5-5½'

E. Three feet of thin-bedded limestone weathering into flat plates. granular, gray. Contains many corals, brachiopods and a few stroms.

F. 3' of hard coarsely to finely granular ls variable in color gray to yellowish. many fossils Upstream 100'-200 yards forms bed and banks of Creek

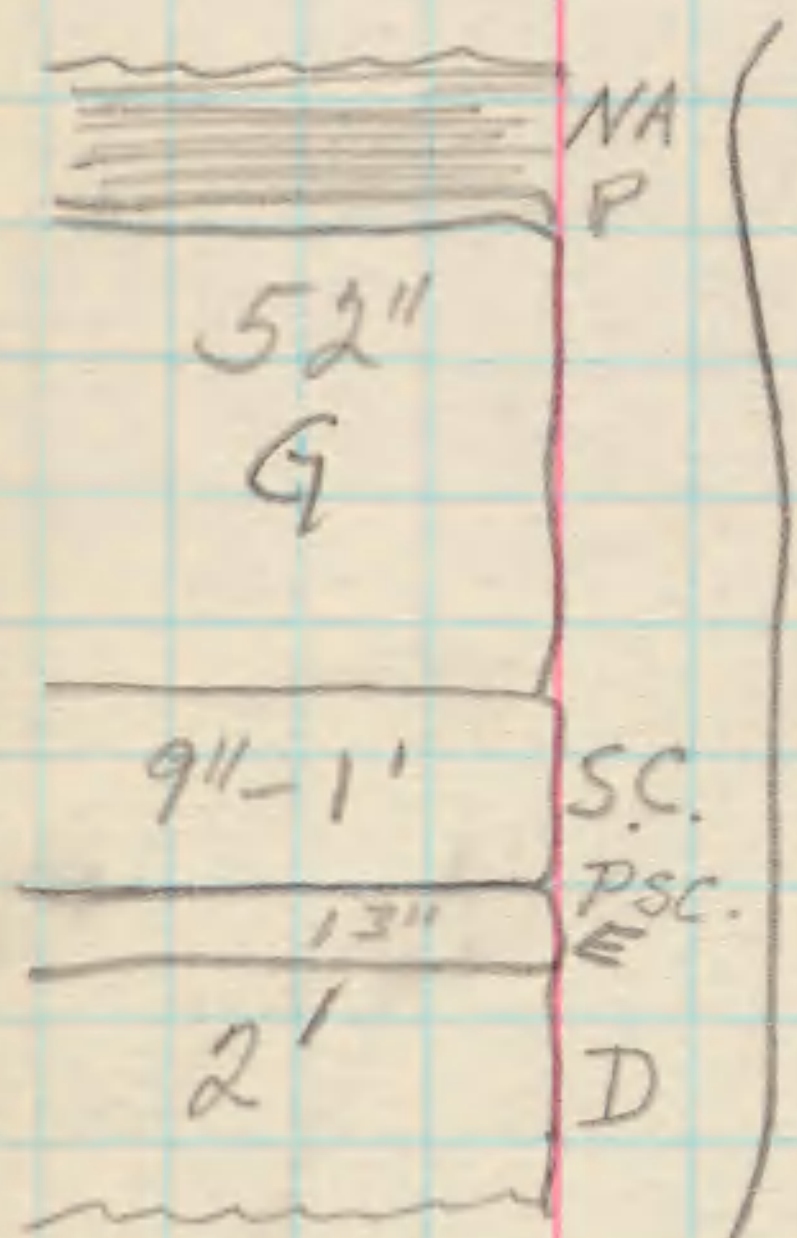
In the cliff the Silurian is cut away under the Devonian ss. leaving the latter and the upper layers as an overhanging ledge.

77

July 25

1832

Section on Hog Creek about 4 miles N of Lexington on Hwy Ind. 56. On ~~Rose~~ Lawson Reiff farm, Indiana



D - 2' of hard blue limestone weathering shelly, contains *Athyris*, *Stroph. defussa* type, *S. concava* type, *Leptaena*, *Cyrtina*, *Rhipidomella* sp. *byrnensis*.

E - 13" hard bluish ls. with *Cyrtina*, *Pholidostrophia*. Wide lined *Spinea*.

P.S.C. Thin layer of pyrite 1/4"

SC - Silver Creek, few fossils, blue, brittle shaly limestone

G - Hard blue limestone lower 64-1' with *Trochidoleptus* and *Chonetes coronatus*.

Upper 3' with large *Athyra*, *Spinea*, *Stroph. concava*. Thickness of this bed variable from 3'-4'.

P - 1 1/2" of pyritiferous ls.

NA - New Albany sh.

The *Cyrtinas* belong in E. So E here is all of 2' thick. See Sec. 1/4 mile N of Big Creek which is correct.

(78)

Bruce Hardy 1833
Quarry 4 miles W of Lexington, Ind.
at intersection of Ind. 3 & 56.

Indiana

G - 1 1/2' Hard blue gray limestone
Silver Creek 2"-8" bluish limestone

E 6"-8" hard blue gray ls. with Cyrtina

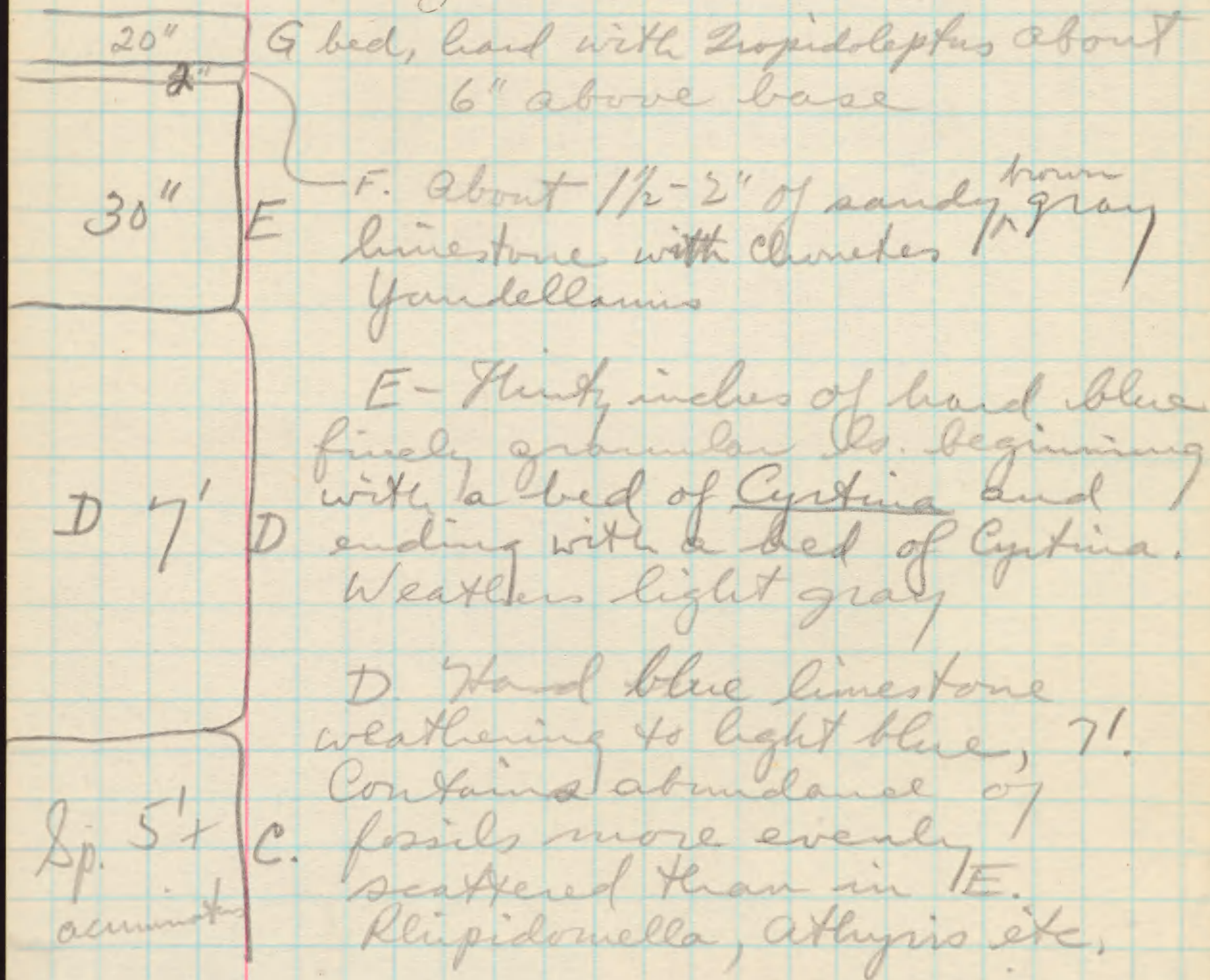
D 13' hard blue gray limestone

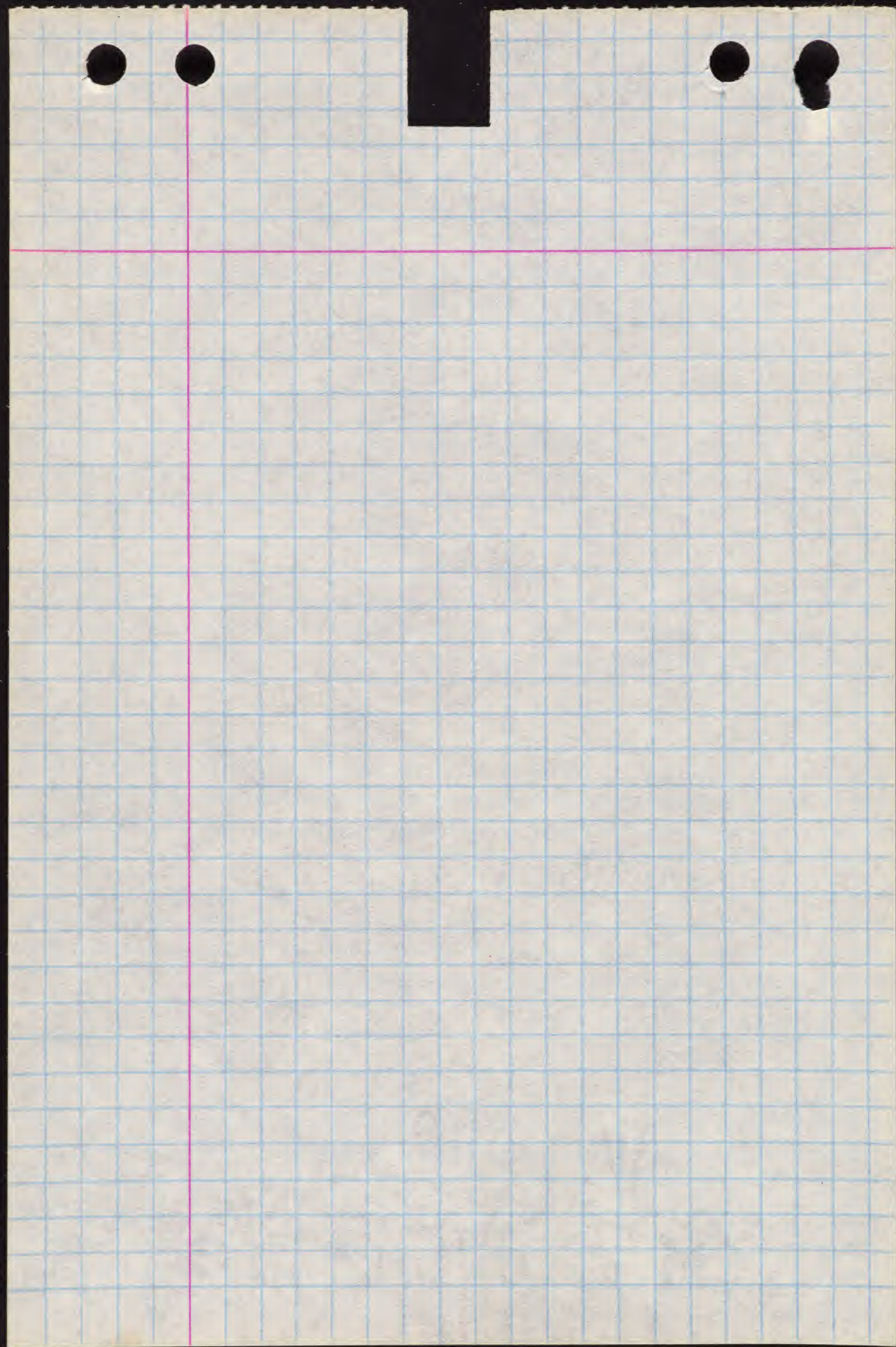
ABC Onondaga

In this section the Silver
Creek is very variable, thinning
to disappearance but thickening
up to about 8" in places.

(79)

Section on Ind. 3, about
1/4 mile N. of Big Creek
Indiana 1834





1835

July 26

Send Mr. Campbell a lot of odd small boxes for casting plaster.

Illinois

July 28 = June 25, 1935

3 miles due west of Mill Creek, all section about 290 feet upstream from road. Here there is a tilted block (or blocks) in stream-bed and bank showing the following section

A. - hard firm shale 18"

B. - soft shale 18"

C. - harder sandy bed 15"

D. - soft shale 15 feet

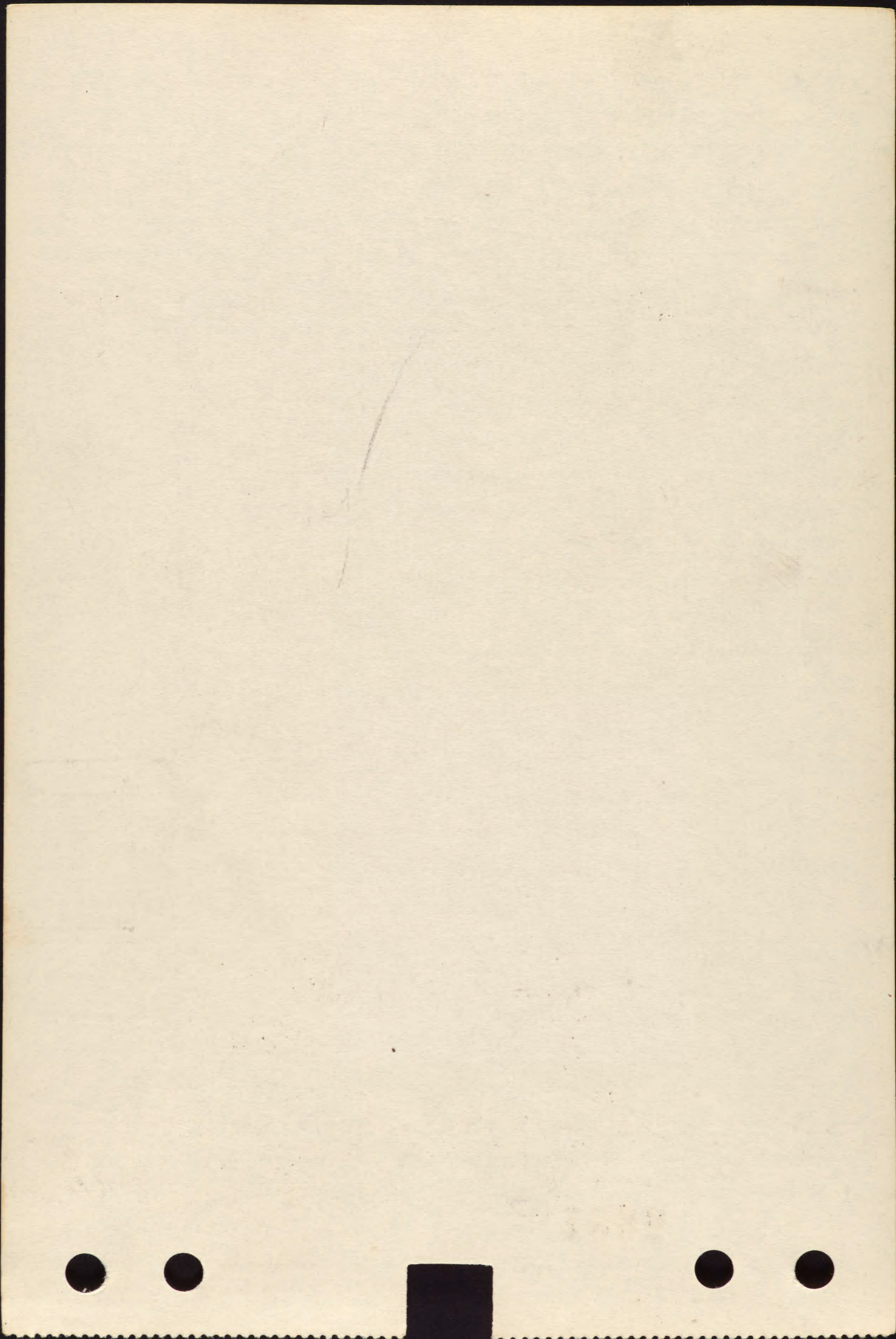
Covered ?

E. - tumbled blocks of hard finely granular gray limestone in subbeds, one 18" with *Tropidoleptus*, another 3' with crinoid stems. A third 18" block had *Vitulina* and *Centronella*. This may belong with the *Tropidoleptus* blocks.

75 feet ~~upstream~~ from the end of this exposure is a big block of sugary white ls. with *Centronella*? ss. was seen as large blocks further upstream.

80

115
230
50



81

2

These blocks appear not to be far out of place. The bed of the creek is ^{filled} mostly by Clear Creek Chert

1836

13 1/2

Section July 28¹ = June 25, 25², 1938
3 miles WNW of Mill Creek, Ill.

A - Gray (light) Mersenne shale with *Lecorhynchus*.

B - limy sandstone without fossils.

C. Yellowish to blue shale
E. at least 5', Only fossil seen is *Elythra*

Covered? C + D = 14'

D: hard, shaly weathering ls. gray, fine-grained, much chert, at least 5'

E. 28" hard blue gray limestone with chert in upper beds. At base contains *Centronella*, *Vitulina* and *Trochodonta* in abundance. Sp. sculptilis.

Upper beds less fossiliferous but contain *Leptostrophia* and *C. coronatus*. Scattered corals all through the bed.

6' + ls with chert

2 1/2

covered 1 1/2

1 1/2"

covered 3'

28"

xxxxxx

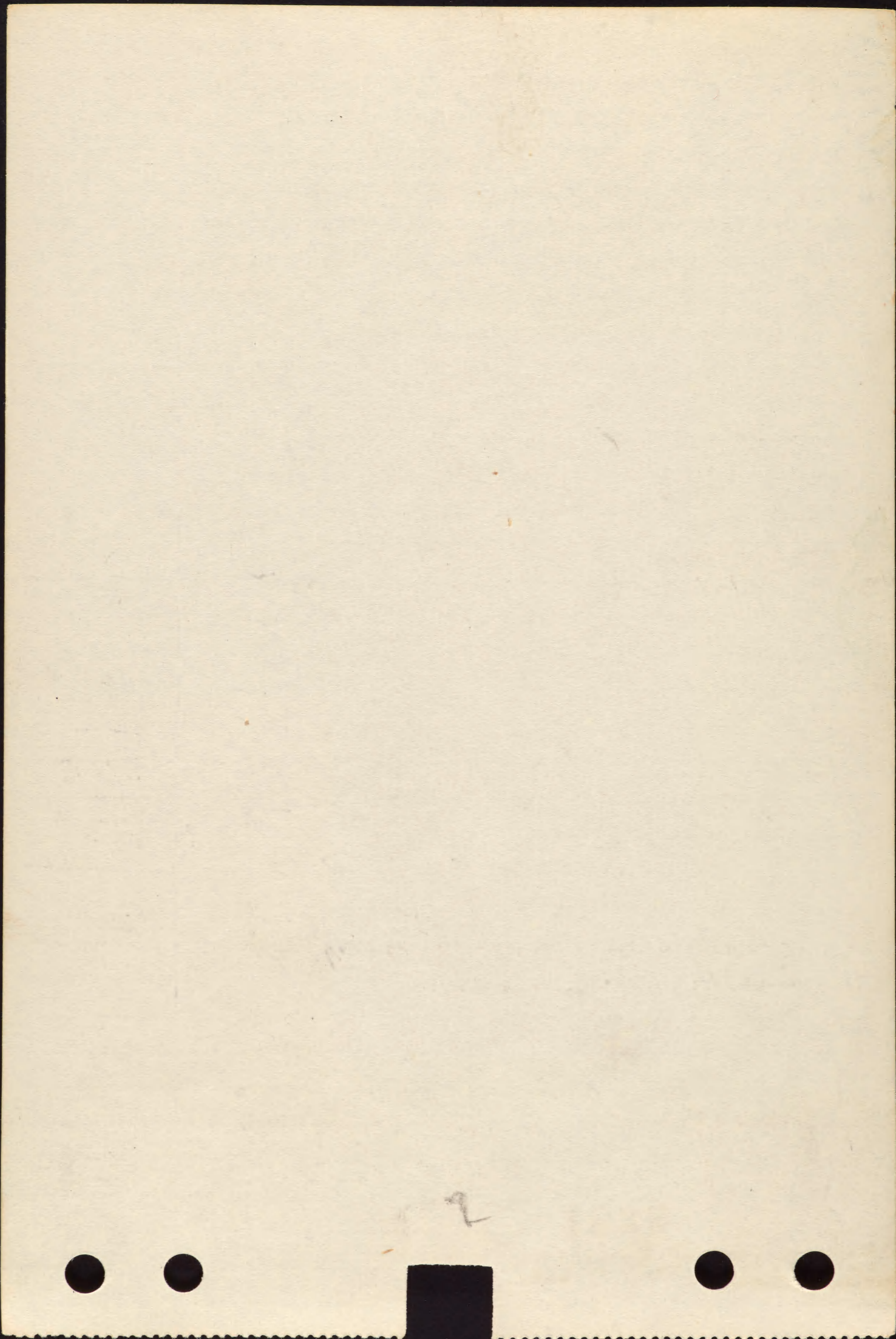
↑
1 1/2
↓

limy ss 2'

Mersenne

shale

17'



82

F. light gray shaly weathering limestone $1\frac{1}{2}'$ with byozoa, Schuchertella, Cystodictya common
Flint nodules
Covered $1\frac{1}{2}'$

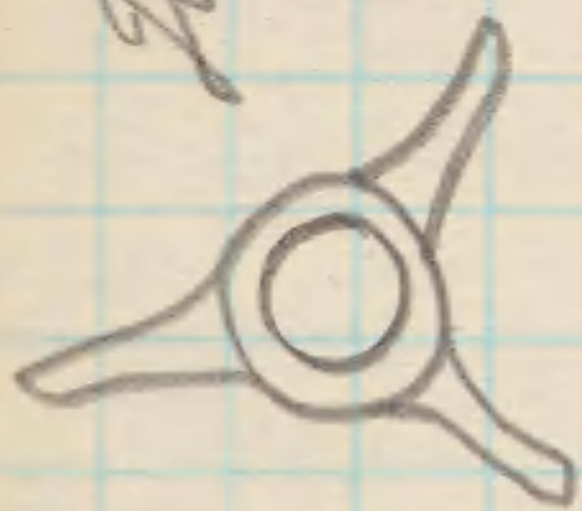
G. $2\frac{1}{2}'$ shaly weathering, gray finely granular limestone with scattered chert.

The next 6' are mostly covered but showed two limestone blocks of rather massive stone abounding in flint and coral debris. & 1

On the slope above this last block no ls was seen, only siliceous shale and chert/slabs showing no fossils. The Hamilton ls appears thus to be about 16 feet thick at this place.

By hand level there are 18'

This is a common crinoid segment in these rocks.



1
3 1 5
5 3 0
1 5 8
2 1 7
4
2 4 151
12 1174
54

1
x

1838

Section near Mtn Glen

J. 25 2. of 1926 notes

83

- A. 2' hard massive ls.
- B. 4" shaly hard ls. with *Chonetes* and large *Leptaena*
- C. 7" hard blue brittle ls. with *Spirifer*

6-7' +

- D. 21" brown gray granular corals.

- E. 18" brown gray ls. with corals a. and a layer of chert 6" below top.

- F. 15" corals abundant

Covered

13' ±

- G. 30" corals abundant

- H. 55" Corals scarce, other fossils common. *Microcyclus* was found within 3' of the top. Called G in package of fossils

3' ±

55"

H

- I. - Hamilton with *Cornellites*, *S. gonzaga*, *C. coronata*, *P. rana* etc. Was unable to determine exact position of *Tropidoleptus* but it seems to be at the base

30"

G

15"

F

18"

E

21"

D

7"

C

4"

B

2'

A

River level

Sandy shale cliffs are present

1839

(84)

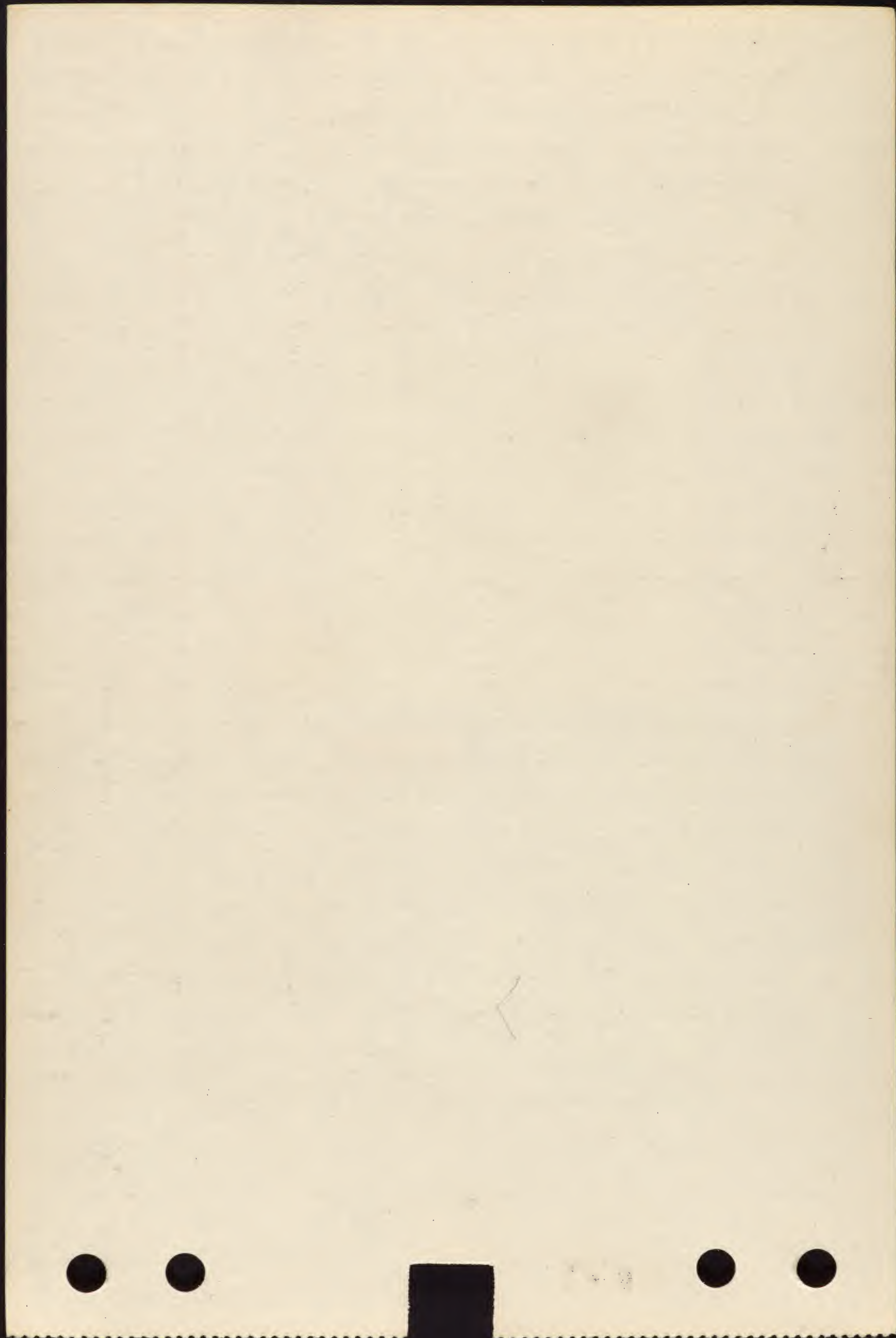
in the rock above the
Hamilton.

~~The dip on the lower bed~~
~~is 0-40° to the East NE.~~

Dip & strike S 27° E 11½° E.

Judging by the topography
the covered interval here
must be shale

Correct compass
for declination set
here at E 90° N



1840

July 29. ^{correct compass N} reading. was set ^{90°} E

Hamilton Section at Bake Oven

Dip and strike N60°W 27° N 30°E

5' #

G A- The uppermost layer of the Grand Tower is taken to be a massive bed of very uneven surface, containing a *Spinifer* like *Sp. gregarius* or *S. lucasi*.

5'

F

Covered
13'

3-
4' #

Atkyus,

E B- *Microcyclus* beds - ~~the lowest~~ ^{weathering} foot. This is somewhat shaler than the Onondaga beds and differs in fauna. The lower foot contains *Leptaena*, *Schizophoria*, *Chonetes* a. The second foot contains small horn corals, *Schizophoria*, small *Chonetes* abundant; The next two feet (4)

D contains *Leptaena*, *Schizophoria*, *Chonetes* a. The second foot contains small horn corals, *Schizophoria*, small *Chonetes* abundant; The next two feet (4) contain small lamellose *Spinifer* *S. formosa*, *Schizophoria* c, *Phacops*. This 2 feet contains two thin shaly zones. The next 26" interval contains *Schizophoria* a, cup corals, small lamellose *Spinifer*, *Strophodontia*. The next 26" interval contains *Microcyclus* at the top, *Strophodontia*, *Paracyclus*, small *Chonetes*.

9' 6"

C

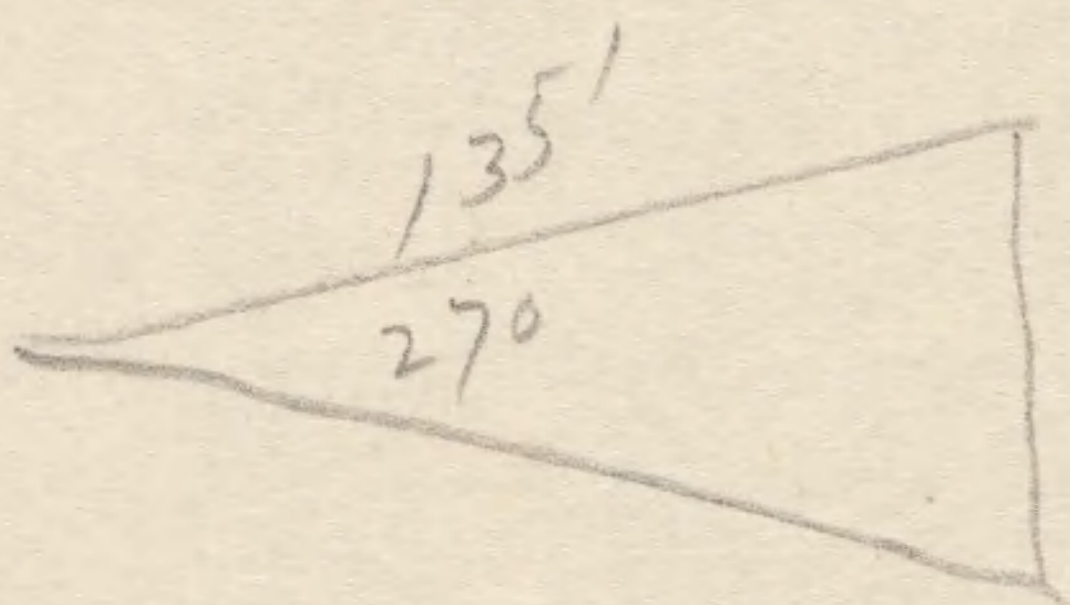
Microcyclus

9' 6"

B.

Grand
Tower

A



135

135
5
675

(86)

C. This interval is composed of hard brittle limestone, dark blue gray. Fossils appear less abundant than below. Small Chonetes, small Schizophoria, Phacops.

D. About 3-4' of brownish hard limestone abounding in *C. coronatus*, *Tropidoleptus* etc. Upper foot shaly, with *Spirifer* & large *Ceph.*

E. 13' covered

F. 5' of hard dark gray limestone weathering to shale-like slabs. Beds in three heavy layers. Small Chonetes abundant in lowest layer. *Tropidoleptus*, *Spirifer*, *Favosites* in uppermost bed. Chert

G. Shale ls, nodular with chert *Sp. murronatus*, small Chonetes.

The horizontal distance from top of A to top of F is 135'. Horizontal distance of covered interval is 38'.

(Boscawen)
in middle
bed.

4067
135
203335
12201
4067
599843
20
34

1842

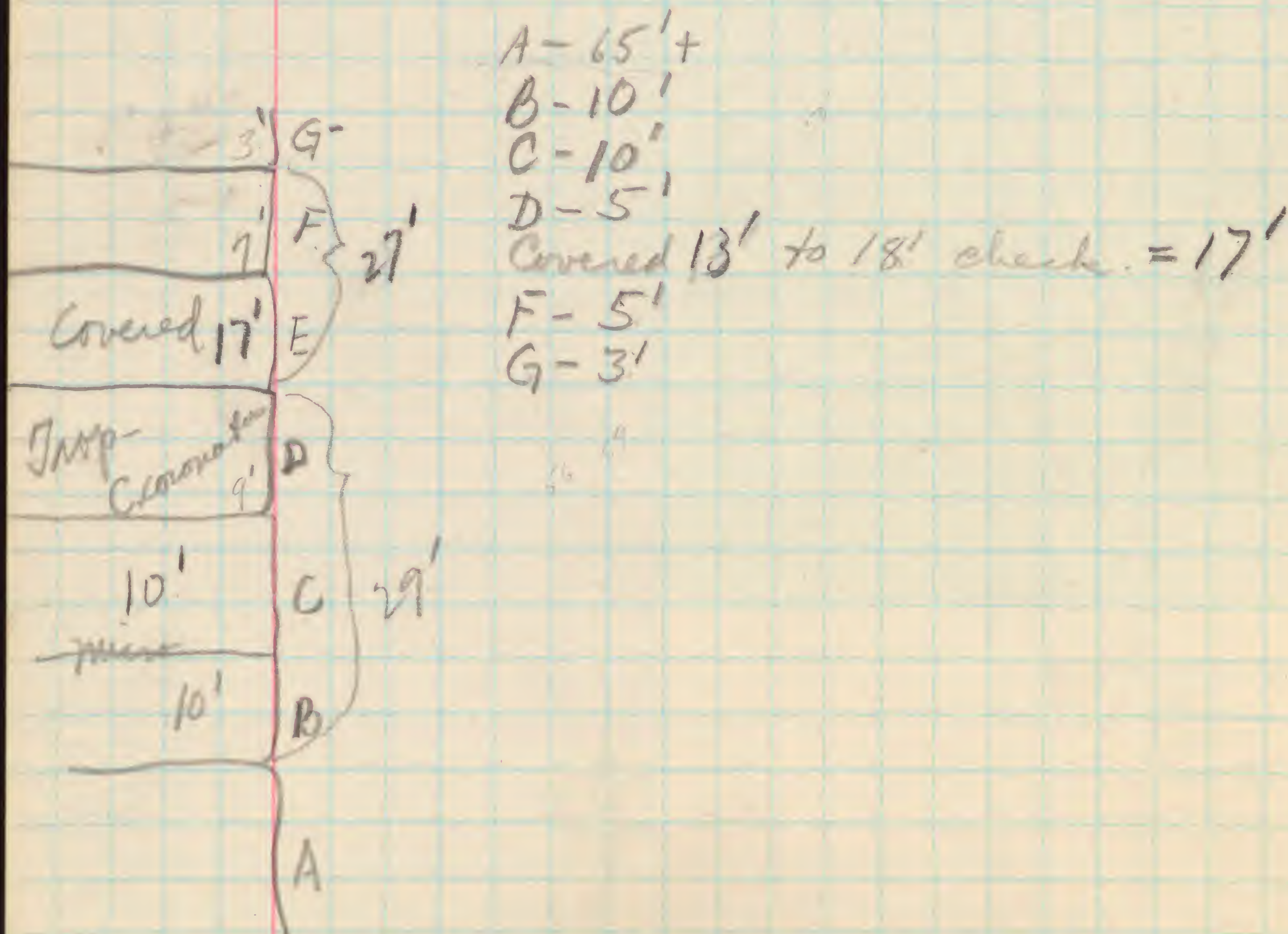
87

July 30
Revisited Bake-Oven.

Horizontal distance from top of Onondaga to top of *Trizidoleptus* bed with *Spurfer* and cephalopods is 65'. From *Trizid.* to top of F is 60' - Total 125'. Covered interval is 50' horizontal.

Measured with a staff I made the thickness (Total) from top of A to top of F 44' = 47'

Section measured with rod



86

July 31.

1843

Section of sandstone about $\frac{3}{4}$ mile north of Boorman school. Sugary sandstone, friable, white or weathered light reddish brown. Contains small and large cephalopods a wedge-shaped clam and a trilobite.



Section going north over hill $\frac{1}{2}$ mile West of road to Boorman school

Lowest five feet in hand ground, blue limestone at base were seen *Nucleocrinus* and crinoids. At top corals appear and chert. Lower half of next hand-level interval with *Favosites* and small tabulates (*digitate*) upper half grayish fine limestone

3rd. Hb. step - finely granular light gray ls. with abundance of *Paracyclas*, and *Cyrtina umbonata* (which may be a *Spirifer* related to *Sp. gregarius*). No corals.

1844

89

4 H.L. Light blue gray finely granular ls. with *Symphlocarids* at top.

5 H.L. - in the lower part *A. spinosa* and *Schizophoria* appears. Also many *Cephalopods*. Thin fine-grained blue ls.

6 H.L. - fine-grained blue gray lumpy ls. abounding in *Schizophoria* and *Schuchertella*. *Phacops* c.

Schizophoria

beds.
33'

7 H.L. *Schizophoria* abundant, small corals common.

8 H.L. same

9 H.L. "

10 H.L. "

22'

Section runs up hill N of house at site L bend of road about 1/2 mile west of Boardman School road. Dip 4° to E

Beaurvais ss.

Fine exposure on south side of Little Saline Creek about 1/4 mile, about 30-40 feet dipping 22° N 10° W. The outcrop is divided into two parts by an erosion channel. On the north side of this channel *Newberrias* are common. This would be about

Correct compass set here at time of reading E 90° N

1845

90

an horizon a little above the middle of the formation. The basal beds are calcareous and the top of the Grand Tower is a white marble. Of the marble ~~at the~~ top of the D.T. there is 15-20'. Between this & the Beauvais there are 15-20' of calcareous sandstone.

D 33

Correct compass
reading set at
time E 90° N

August 1

1846

25
55
9
13
7 1/2
20
107

Section over hill 570° E

30 91

A. calcareo arenaceous conglomerate 2'

Miss Z-20' B- 5 1/2, 11 1/2 light gray thin bedded
sandy ls.

foss 2'
covered
foss 1'

16 1/2 thin to heavy bedded
buff sandy ls, 22, 27 1/2, 33.

consists of lithographic and
sandy limestone. Strike
N 70 E, 14 1/4° SW.

33-55' same.

55'-88' - covered except for
small patch of chert on summit

10-13'
sandstone

9' chert slope

Main ledge

limestone and sandy
limestone

On the slope of the hill
facing due south and about
20' below the summit is
a ledge of massive, hard
buff limestone containing
Hamilton fossils Large *Atrypa*,
C. flabellus, *Sp. mucronatus*,
Cyrtina, *L. pteroplana*, and *S.*
concora

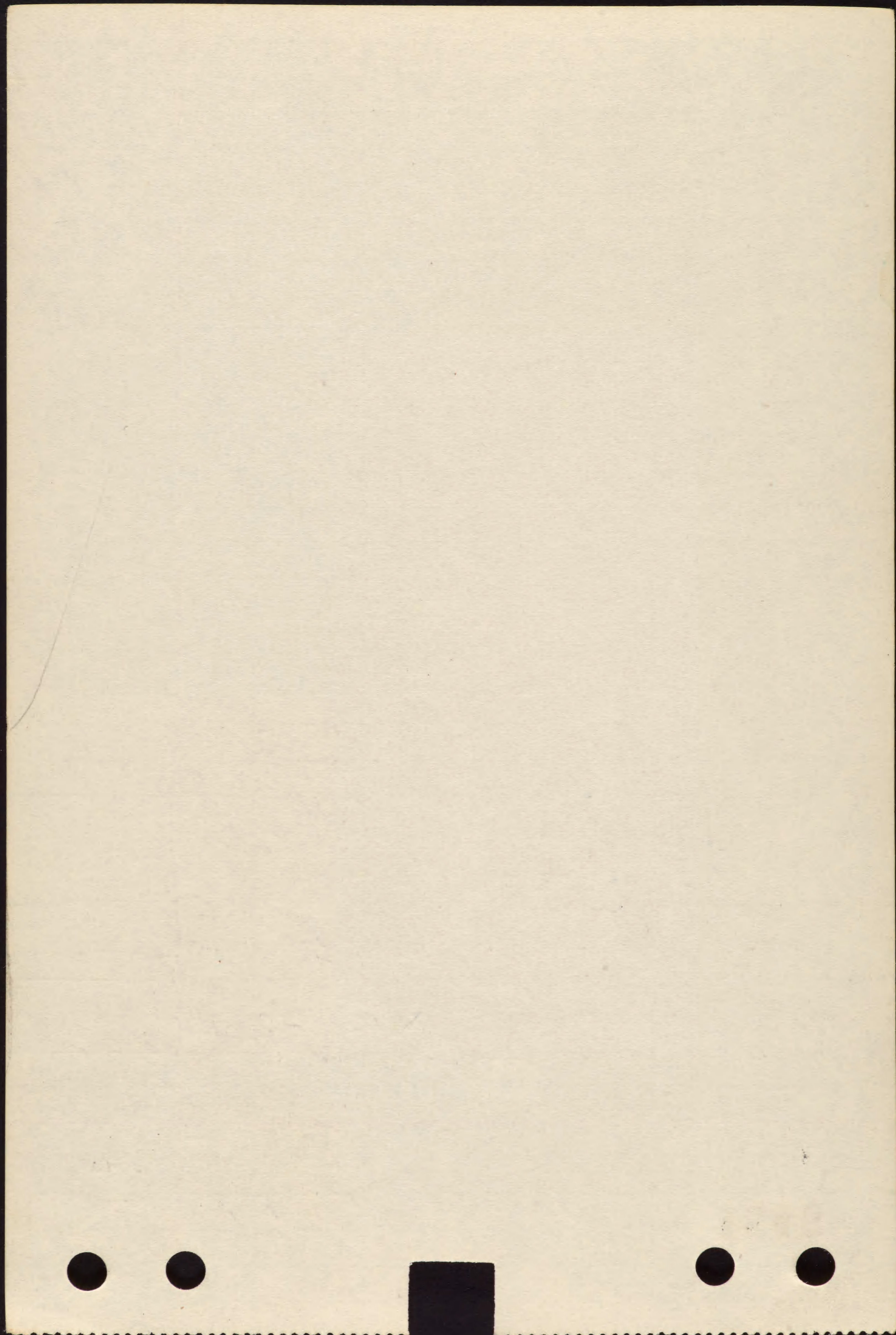
5 1/2' below the top of this ledge
is another containing fossils.

A It is also hard, buff and
contains *Rhipidomella*, *Athyra*,
Pterinea flabellum and *Cyrtina*.
The actual ledge is about 1' thick

Conglomerate 2'

15' sandy
platy ls.

Grand Tower



92

Below this bed comes an interval of 13' mostly covered but showing sandstone blocks in the talus. At 13' below this second ledge chert (sandy light brownish gray) appears in the talus. This is not true chert but appears to be a sandstone. Here were seen *Tropidoleptus*, *P. flabellum*, *Actinoptera*, *Strophodontia*, *Proetus*, etc. 9 feet below first block of chert is main scarp edge of the formation.

~~Also the 10-13' interval of no blocks and~~

Above the uppermost ledge of limestone plates and blocks of limestone with fossils were seen loose in the dirt. These blocks contain *C. scitulus* and *S. mucronatus*.

93

Section on St. Laurent
Creek. 1848

14 1/2
23
34 1/2

Note on Compass readings, all
taken with declination at 9° to east.
correct here and all preceding stations

A. 2' heavy-bedded, lumpy, fine-grained sandstone without fossils. Light gray. N 80 W 66° N. To this may be added 25' on bottom.

B. - Single massive, quartzitic bed, fine grained 7' 3". base unconformable with A.

C. 12' fine grained sandstone, light yellow or pinkish gray, ~~being~~ breaking into thick lumps. *Spizifer* about at three feet above base

D. 5 1/2' of sugary sandstone in a single massive ledge. Dip here is nearly vertical. Hard, coarse grained, brownish gray

E. 41" covered.

F. 30" coarse light gray quartzite

G. 7 1/2' covered

H. 8' quartzite, soft coarse, limonitic at base, hard gray brown, dense, massive at top.

I. 18' covered.

See next Page ~~forward~~

1849

94

10 ss <i>Tropidoleptus</i>	Q	J. 2½' coarse calcareous sandstone with fossils, <i>Chonetes</i> , <i>Atypa</i> , coral
16'	P	
12'	O	K - hard massive blue gray calcareous sandstone 12'
7½'	N	L - hard sandy limestone with beds abounding in fossils. At base are <i>Schizophoria</i> , <i>Atypa</i> , <i>Chonetes coronatus</i> ?, <i>Proetus</i> . About 4' above base <i>S. audaculus</i> is abundant. Above this <i>S. mucronatus</i> is common. Fish
13'	M	
12'	L	M - 13' feet of sandy limestone massive, dark bluish
Many fossils	K	
12'	J	N - 7½ feet thin-bedded, platy sandy limestone abounding in <i>C. coronatus</i> , <i>S. mucronatus</i> , <i>Camerozoechia</i> .
1½'	I	
18'	H	O. - 12' sandy limestone passing into calcareous ss. with small <i>Chonetes</i> , <i>C. flabellus</i> and <i>Camerozoechia</i>
8'	G	
7½'	F	P. 16' of dark brown-gray to blue arenaceous limestone
30" over 4½"	E	
5½'	D	
12'	C	
7'3"	B	
+25'	A	

5
34.5

38

16

13

2

38

20.5

25.5

33.5

11.5

12.

7.

251.5

95-

in massive layers (3). At base *Leiorhynchus*, in middle and top *Pecten* is common.

Q. 10' - pinkish-white ^{to gray} fine-grained ss. having the texture of table salt. In lowest part of edge occurs *C. mucronatus*, *S. mucronatus*, *C. flabellus*, ~~and~~ little above the middle *Tropidoleptus* was found. This is the first it was seen in the section.

Total section
25 1/2'

34 1/2'

R - 2' bed of hard ~~cherty~~ quartzite containing a half or more of brown chert. *C. mucronatus*, *Leptostrophia*, *Pholidops*.

V S - 13' covered except for upper foot.

38'
covered

T - 16' gray sandy limestone, ~~mostly~~ containing brown chert (chert here and in R is brown on weathered surface, gray or black within). Abounds in *C. mucronatus*, also *P. rana rana*.

16'

T U - 38' covered.

13'

S

V. - 34 1/2' of hard, heavy

2' chert bed

R

bedded smooth blue brown-

Q

1851

96

gray limestone with many fossils in thin bands. For scattered *Camarotoechia*, *Sp. mucronatus*, *Proetus*, *Greenops*, *Cyrtina*, *Athyris*, here the beds strike $N 83^{\circ} W$ and dip $77^{\circ} N$. Basal bed of this interval contains small *Cystiphyllum*. The *Camarotoechia* follows about 7' above the base. *C. coronatus* is common $10\frac{1}{2}'$ above base. The *Athyris* is in another layer with *Cystiphyllum* about 20' above base. *Cyrtina* is common here also. Above this *Sp. mucronatus* is most common.

At base of section A may be taken as 25' because a patch of it is present below (upstream) from the outcrops. This patch has a different dip and strike but is lithologically the same as the beds below the heavy ss. B.

(99)

August 4.

1852

Bellamy Springs.

Get Mr. Greel Vincentown
Chesapeake Bay. Foreign
washings for Bryozoa + forams
also R.S.B.

Aug 6

The lower 3-5 feet of Callaway
are a veritable coral reef the rock
abounds in corals, *Acervularia*,
cup corals. At the top of 3-4' they
become less abundant and
brachiopods come in. The lower
limestone is light gray. The
upper beds (2') weather to a
brown color but are blue gray
in color. The upper layers are
crowded with *Atrypa missouriensis*
and occasional *Cyrtina missouriensis*
and *Sp. annae*. Of the *Atrypa* beds
there appear to be about 2-3'

Above *Atrypa* the rock is
smoother in texture, lighter
gray and contains many
Stromatopora and *Bryozoa*? At
about 15' above the base the
rock contains algae and
a small *Athyris*. There are
about 25' of Callaway in all,
the upper 15 at least composed
of the algal ls. The top of
the little hill is covered by ss.

Bryozoa
and
algal
ls. 15'

E
2-3' *Atrypa*
D

3' + coal
ls.
C

6-8'
sugary
B
ss.

A 5' coral
ls.

Ord. blue
sh + ls.

1853

Aug. 6

(98)

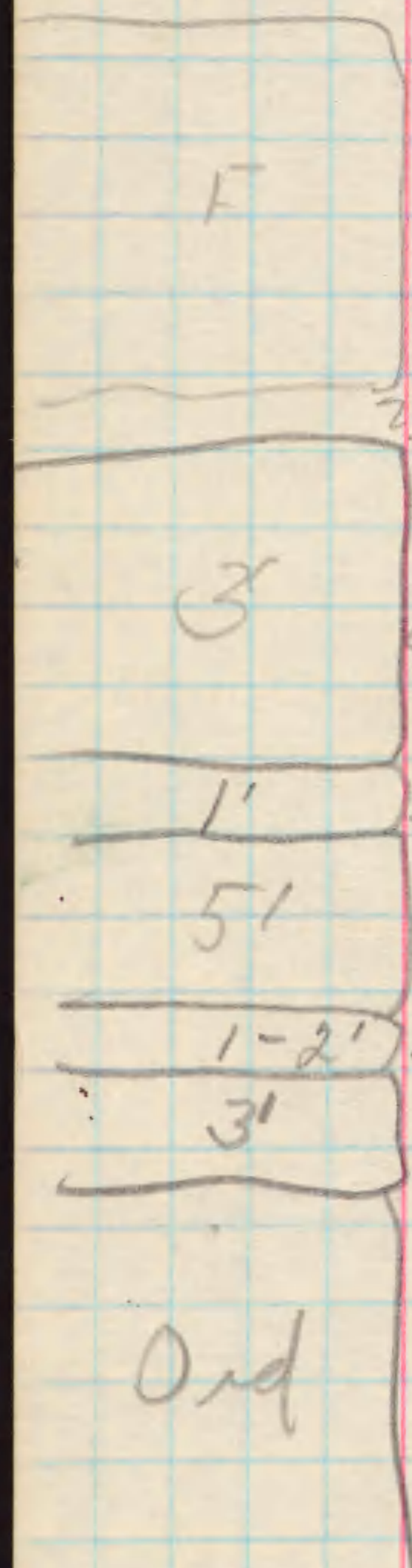
Section in RR cut 1 1/2 miles
S of Holt summit

A - 3' hard calcareous ss.
B. - 1-2' hard massive, sandy
pinkish gray ls.
C. Mostly unfossiliferous smooth,
light gray massive ls. 5' Fossils
occur at top, Cranaea (large)
At top is a shale parting 8 ft - 1 1/2
inches, ~~with~~

D - dark gray, granular ls. with
many fossils, Stropheodonta,
Eosyringothyris, Cyrtina, etc. The
bed is divided into 2 parts by
E. a shale parting of 1-2" in
the middle.

E. - is 3' of massive dark
gray to brownish gray ls.
Abounding in Syringothyris,
big Schizophoria, Athyris etc.

F - The smooth gray ls.
with algae appears north
of this above exposures in
another cut



Ann Repts Bur. of
Geology for 1854. 99

Mouth of Cow Creek

1854

A. - Jeff City

B. - finely granular gray ls.
few fossils 7'

C - 2' 2" - gray granular
limestone abounding in fine-
lined *Atrypa* like *missouriensis*

27 1/2'

D

D. 27 1/2' - Callaway

2' 2"

C

5 1/2' 7'

B.

A

Jeff City

B. - upper 2' of B is in
hard gray brown ls. with
many *Astiphyllum*. Base
of B is very sandy.

B = *mineola*

1855

Cow Creek, S. of Yucatan.

100

At creek level occurs the Pelecypod zone of the Snyder Creek some 8' thick or more. This is overlain by $\frac{1}{2}$ foot or 1' of limestone packed with Schizophoria. This is followed by blue gray shaly limestone abounding in Spirifer. Above Spirifer there are two or more feet of shaly limestone with few fossils. This is overlain by a three to four foot ledge of hard limestone abounding in Strophodonts. Then follows Kinderhook ss. and Burlington ls.

To reach this locality take Hy 40 nearly to Williamsburg then go south on county road D to Yucatan and from Yucatan to the creek.

Raymond E. Peck
Instructor U. of Missouri

Best to write to J. D. Davies, U. of Missouri for Pennsylvanian Fusulina of Boone & Randolph Cos. from Cherokee & Henrietta.

1856

101

Section of Cooper ls in a quarry about 20-21 miles south of Columbia, Mo.

A - 3' massive pinkish to brownish gray limestone thin-bedded & shaly in upper 6". Here fish fragments were seen.

B - 13 1/2' - light gray lithographic limestone weathering to a blue gray, in heavy bedded layers.

C - 1' same abounding in snails.

D - 3 1/2' of fine grained, light granular limestone abounding in two species of Favosites, Stromatopora, Atrypa, Pentamerella. Large snail

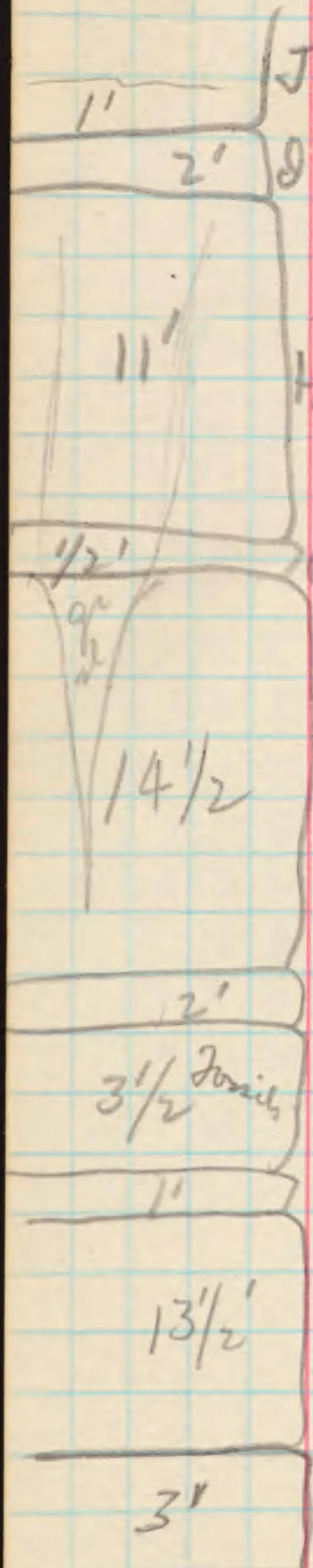
E - 2' light gray ls. with dark, broken Stromatopora.

F - 14 1/2' smooth gray limestone in massive layers. No fossils seen.

G - 9 1/2' - white clay shale with nodular Favosites and byozoa

H - fine-grained light gray limestone, thin-bedded and

St. Peter



102

much fractured

1857

H - 11' fractured smooth gray limestone with calcite particles scattered in the mass.

I - 2' - rubble, crumbly light gray ls.

J. - a ledge of gray ^{finely} granular limestone weathering ^{dark gray} possibly Callaway. 11' +

Drilling a core in F, G, and H was seen green shale suggesting Snyder Creek.

47

Aug 15.

1863

108

Visited Minicola limestone about one mile south of Rensselaer following directions of J. S. Williams. Took rd down (south) center of sec 3 to junction with rd along north line section 10. Follow stream gully SE about $\frac{1}{2}$ - $\frac{3}{4}$ miles to exposure. Lowest rock is rather smooth dove, ash weathering limestone, brecciated in places. It strongly suggests the Cooper but is placed at the base of the Minicola. This is succeeded by some 8-10' of fossiliferous limestone abounding in broken corals and other fossils.

Prismatophyllum	Chocandium
Favosites	Snails (4 sp)
Bygonia	Athyra
Pentamerella	Spirifer
Cranaena	Cyrtina

The rock here suggests the reef limestone as at Alpena and elsewhere. Saw not no obvious Cedar Valley resemblances.

1858

47
103

Exposure on Irish Hollow
behind M.E. Church, Hamburg cell.

A - $16\frac{1}{2}'$ hard massive limestone
light gray, fine, smooth to crystalline.
In uppermost bed many Cephalopods.
Minstina, Chelonicus, Eospirifer. All
appears to be Silurian.

Hamburg

B. $1'$ - sugary to lumpy hard,
fine grained ss. with *Atrypa*,
Strophodontas, corals, at top *Atrypas*
of *Lystix* type.

Blank

C - $2\frac{1}{2}'$ of fine grained
sandstone breaking into
irregular plates, like the
fine-grained sandstones in
New York. Contains *Atrypas*
of *Lystix* type, *Spirifer* like
ibensis, *Schizophoria* and
Strophodontas.

Blank
Louisiana

$10'' - 1'$

D - Hard massive layer
about $6''$ thick containing
many worm-boirings on
the upper surface. This
is overlain by about $10''$ of
greenish shale.

$2\frac{1}{2}'$

$10'' - 1'$

$16\frac{1}{2}'$

A - Hard massive layer
about $6''$ thick containing
many worm-boirings on
the upper surface. This
is overlain by about $10''$ of
greenish shale.

B - D is Devonian.

1859

104

The rock ^{of C+D} is apparently strongly ^{not a ss} lumpy, and in places is yellow like the Cedar Valley.

Section in Salt Spring Hollow

A - 1-2' of hard blue, yellow gray or buff ls. without fossils.

B - 13' minus - shaly weathering light gray limestone abounding in white chert. Fossils common *Sp. iowensis*, *Schizophoria*, *Leptostrophia*, *Pentamerella*, *Strophodontas*, corals, *Schuchertella*, *Atrypa lysteri* type. The upper 3-5' are largely covered.

C - of heavy-bedded massive light gray granular to crinoidal limestone with *Atrypa*, *Pholidostrophia*, *Cyrtina*, *Strophodontas* and corals.

D - 1 1/2' of coarse sugary, hard sandstone weathering dark brown, and abounding in fossils. Upper surface with large *Favosites*.

Loess

1 1/2'

9'

13'

1-2'

10'±

Silurian

1860

105

In the lower part of C.
a Schizophoria is common.
About 4-5' Cyrtina is
abundant and at the very
top a small Atrypa is common.

Exposures along a little
creek in ~~section NE 1/4 20~~
SW cor. SE 1/4 NE 1/4 20-18-2W.

In the lowest 5' of the
exposed Devonian were seen
numerous Cranaena, Brontes,
Douvillina, Pholidostrophia, Proetus,
clams, etc. The fauna suggests
the beds at Solon or perhaps
Corbottle. These beds underlie
the limestones with Sp. cownensis
and Schizophoria which may
be seen farther upstream ^{and}
a little west of the spring.
The rock carrying the Trebratuloids
and Brontes is a shelly ls.
often in thick plates and
very hard.

1861

Aug. 14.

106

Beeds carrying *Bronteus* and associated forms are about 8' feet thick and underly yellowish sandy platy limestone with *Spirifer*, *Schizophoria*, *Leptostrophia*, *Schuchertella*, *Strophodontia*, *Pholidostrophia*. The same beds that form the basal part of the Salt Spring follow section. In the upper part of the creek below Katesville *Prismatophyllum* was present. It was also seen where we found the *Bronteus* but not in places.

The exposures are in the bed of the creek slightly west of the first house. The rock is hard platy limestone

1862

(46)

Section 3 miles west
of Fieldon, Illinois

Cooper
107
H. suggests
lithology.

A - Smooth massive
dove colored limestone without fossils
possibly Silurian, possibly
same as at base of
section in Salt Spring
Hollow. Contains small crystals
of calcite

B - About 22' of limestone
shaly in the lower part
but upper 8-10' massive
with corals and crinoid
fragments. In the upper
part *Pholidostrophia* is
very abundant.

In lower part the
rock is rather shaly
and abounds in
sp. of the *vivensis* type

1-2 1/2' C.

22' B

5' A

C. - About 1' of rather coarse
sand abounding in fossils
particularly *Atrypa* and
Cyrtina.

AA

AA - Dove colored ls. rests on
greenish granular irregularly
bedded lg.

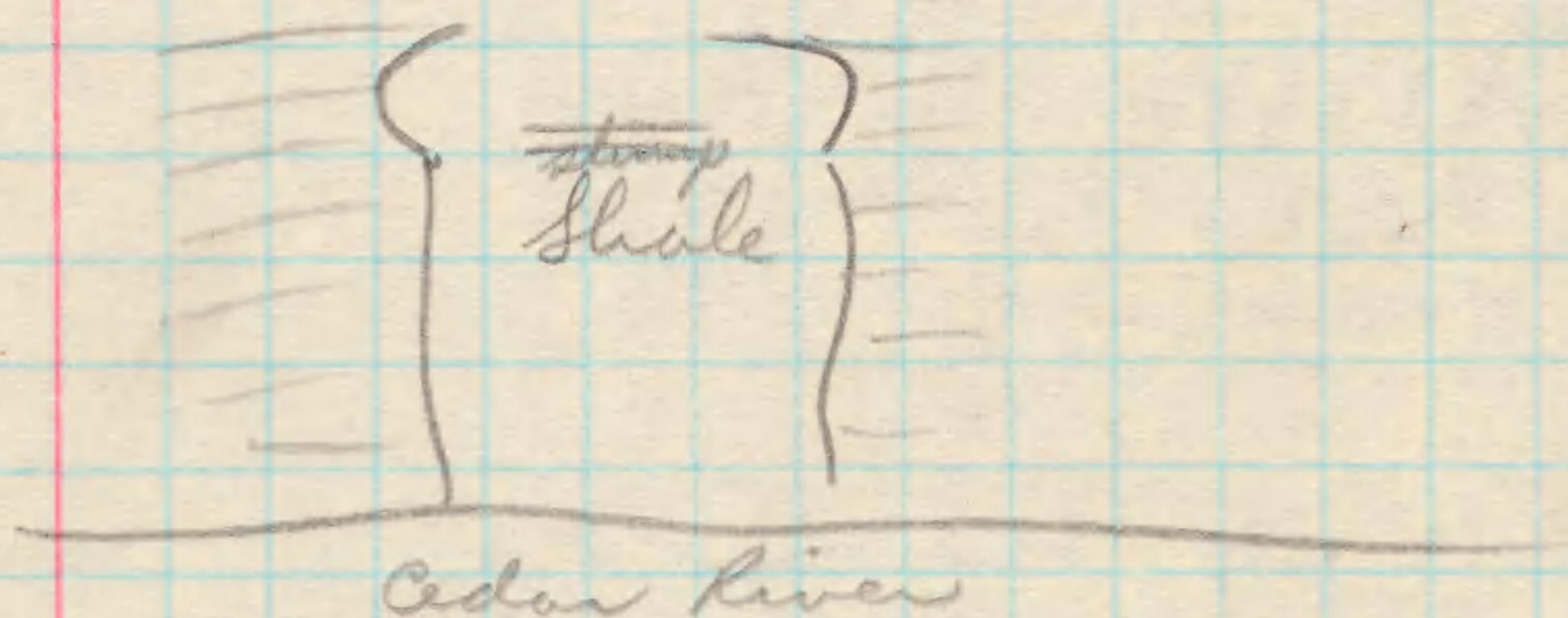
Contact of Cooper? and Cedar
Valley is about 1 or 2 rds
upstream from ford.

1864

109

Independence shale 2 miles
5 and $1\frac{1}{2}$ miles due west of Brandon
Iowa, Cedar River section described
by Savage in the Benton Co. report.

Cedar Valley exposed as a bluff
along the Cedar River. Independence
shale occupies ^{half} a funnel shaped
depression. The sides of the Cedar
Valley bounding the shale are
rather sharp. ~~Rock~~ ~~is~~ ~~at~~
at the base ~~side~~ of the outcrop and ^{low} ~~on~~ ~~the~~ ~~side~~
Ridge is filled or broken. Possible
slumped blocks occupy a portion of
the interior of the funnel. The
funnel is not complete as
part of the section is covered



Shellsburg, W. Va. 1865

110

Went down 55' before samples were taken.

- 55-60 - Gyroceras beds (basal Linwood)
- 60-65 - Independence sh, calcilutite fragments
- 65-70 - ^{blue} shale with pyrite (Independence)
- 70-75 - blue sh. with Tentaculites (Ind.)
- 75-80 - blue shale
- 80-85 - shaly but mostly calcilutite
- 85-90 - mostly earthy ls.
- 90-95 - harder ls.
- 95-100 - " "
- 100-105 - shaly material
- 105-110 - shaly - earthy limestone (Crinoid)
- 110-115 - calcilutite (fossils)
- 115-120 - Lithographic ls. Otis
- 120-125 - " " "
- 125-130 - " " fossils (Coggan)
- 130-135 - " " "
- 135-140 - " " fossils (Coggan)

70-75 - Crinoid segment, Tentaculites, unrecognizable fragments

- 135-140 - D. variabilis, D. arcuata
- 115-120 - D. variabilis.
- 150-155 - Stroph. reversa.

D. arcuata found 70' below limestone at Walker.

1866

111

Independence - mid sec. 25,
Washington Tn. Linn Co at
bridge over Otter Creek

Here Stairwork would
have faults to account for
position of Independence

Stairwork

Lower Linnwood

Independence

Buccia
without
fossils

upper
Linnwood
A. independence

112

Pine Creek
near Anagueton.

1867

Independence shale occupies
a depression about 100 yds upstream
and rests against a block of
Newberia zone tilted upstream.
And the Newberia block rests against
undisturbed Independence zone.
Large tilted blocks occur on W side
of stream.

Aug 20.

Cedar Valley 2.2 miles NW
of Spring Valley on Hy US 63.

A - Heavy massive ledge of
buff dolomite 3' thick

Trochonema

Cyrtina

Spinifer

Atrypa etc.

Proetus

B

B - Buff porous dolomite
A crumbling to small fragments
the size of a cobble, contains
an Atrypa like A. independence.

1868

113

Near Hamilton, Minnesota
A Under the bridge over Bear
Creek a short distance S of
Hamilton there is Ordovician
dolomitic limestone and shale
about 10 or 15'.

Under bridge over the same
Creek on Hy U.S. 63, a short
distance S of Racine is exposed
considerable Devonian.

B. - Covered

C - about 13', mostly covered
but showing thin-bedded, fine
grained, cream - to yellow dolomite?
but no fossils were seen.

D - 1 1/2 - 2' thick bedded yellow
E dolomite with few fossils

D E - 9-10' of heavy massive
ledges of dolomite with many
fossils

B. F - 5+ - crumbly buff to
yellow dolomite with many
fossils

A

About 1/2 mile S of bridge
on W side road about 5' of
platy brittle, dove colored ls.
but no fossils were seen
except a crinoid column.

114

Fowler & Pay Qy.

1869

A - 7-8' lithographic, white ls. in thick layers often separated by thin seams of green clay!

B - 10" white ls. with many fossils mostly small strophotopores.

C. 1 1/2' gray lithographic ls.

D - broken ls. mixed with brown loam

E - platy, thin-bedded white ls. suggesting fresh-water deposit.

Sink in Qy.

A

No slumping on sides of sink

Limestone

Sandy clay

bottom Qy

0510

E

D

C

B

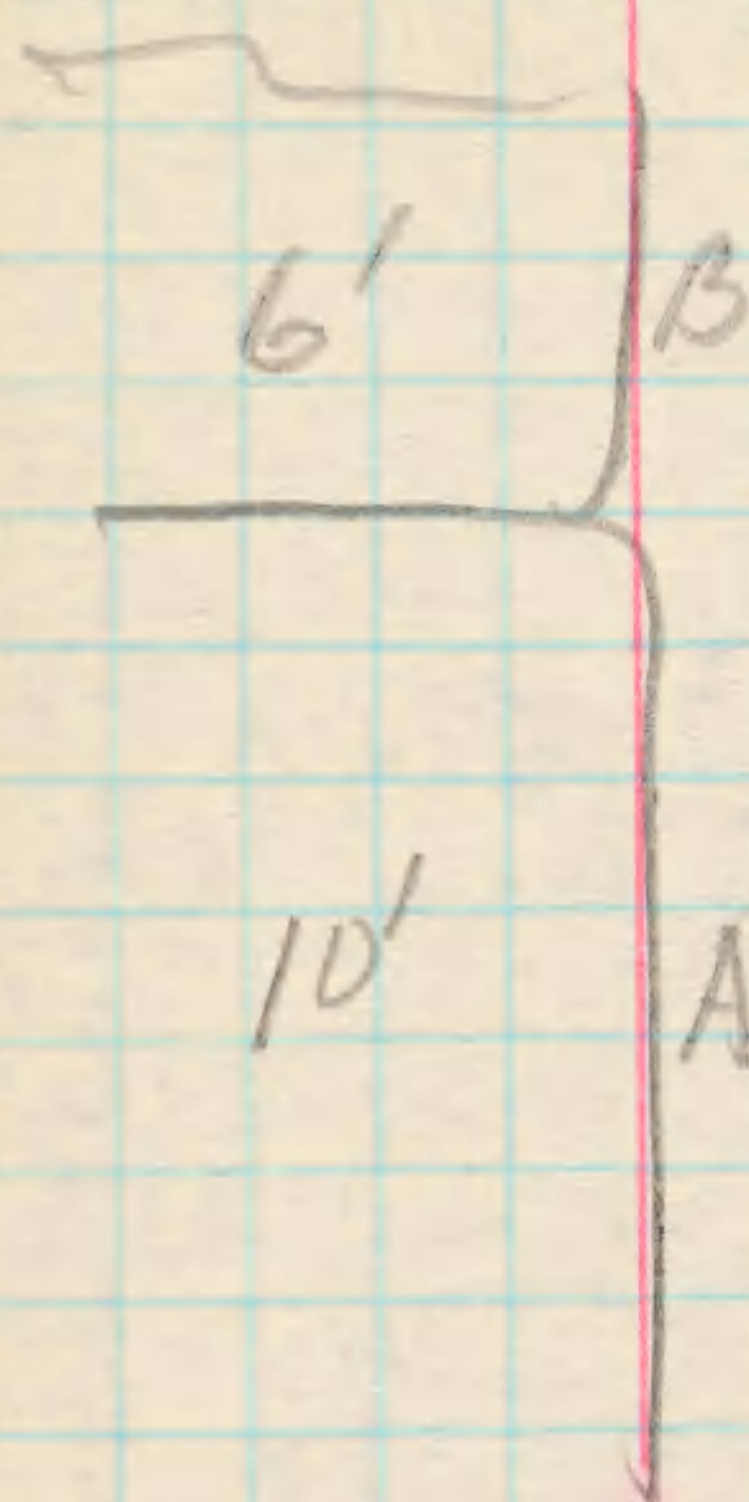
1870

145

Larson Ry.
Spring Valley, Minn.

A. Two ledges heavy yellow dolomite
very fossiliferous aggregating
10'

B - about 6' rubble yellow
dolomite, much pitted.
A. lustris seen.



The beds of Devonian
around Larson suggest
the same lithology as
at the top of the
Traverse in the
central part of Michigan
It suggests a shoaling
of waters with decreasing
salinity

146

Aug 21.

1871

To reach West Bend Hill
Take Floyd + Cerro Gordo
Co. Hy D. to the outcrops,
just 5 miles.

Aug. 25

Crallville Sec 15 Buffalo Twp.
about 1 mile N. of Buffalo.

A - 4-5' massive "fucoidal"
sandy blue ls weathering to
yellow.

B - 4-10' ± leached sandy
C limestone now gray to yellow
with many sheets of
Stromatopora. Thin and lamellar
when turned over show strong
concentric rings. In this
part Athyris, Canadana,
Cameropteria occur with a
few corals, Zaphrentis, and
like Cladopora. At top is
a one foot layer with
large Strophodontia
large Sclerophoria, cup corals

C. Brown rotted dolomitic ls.

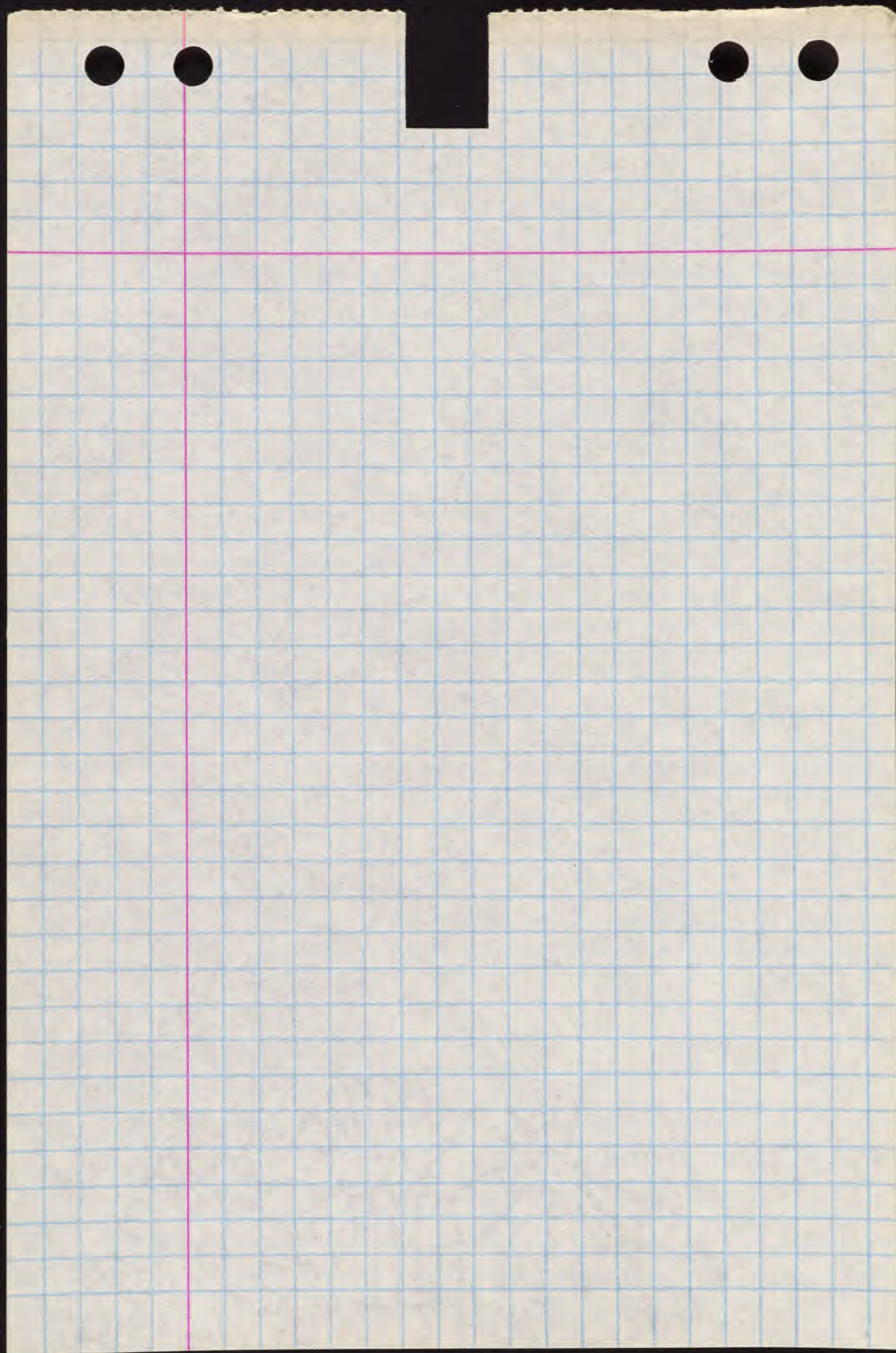
This section strongly suggests the
upper Callaway with its sheets of lamellar Stromas

1872

167

Notes on lower Missourian - alluvial

The Missourian section appears to be well represented in the Cedar Valley. The Minola may represent the Davidson zone near the top of the Littleton and this would make the Callaway Corralville. The lower Callaway is equal to the Waterlooensis zone and the upper Callaway equal to the Cranaena zone. In Calhoun Co the Brontons zone equals the Waterlooensis zone and the rest of the section equals the Cranaena zone.



158

August 28.

1873

Beds with *Sypidula*
petoskeyensis at base of
Pohl's bed. 21 appear at
intersection of Encampment
ave. and U.S. 31. about 100
yds. NE of the Penna R.R.
Station at Bayview.

Ask Ehlers to send me
section and specimens.

Ask Dr. Ehlers for correspond-
ence or information on
nomenclature of Gravel Pt.

Aug. 29.

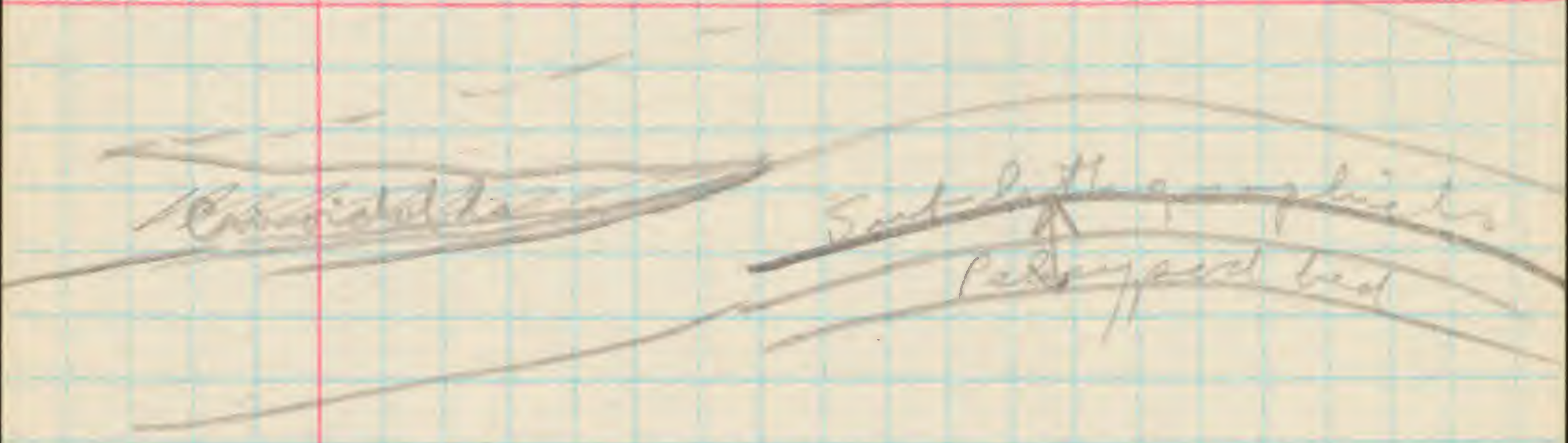
Get print of section on shore
at Bayview showing Pohl's
bed b. in possession of Dr.
A.W. Slocum.

~~The zone of~~ Send Ehlers
one or two *Strobilocrinites*.
Look for dorsal valves of
Leptalosia in 14 c, if none
are found write to Slocum
for some.

189

Shore at Curtis Bay

1874



Criminal ls of basal Petoskey lies in a syncline beveled by topography. It was a low anticline of Palaeypod bed and superjacent layers but no criminal, which has been eroded off.

Criminal bed seems to me to be a lens thinning eastward from shore. No east wall of Curtis Bay, it thickens westward and NW going west from Bay.

1875

Aug 30, 1936

150

Charlevoix in mostly shallow
water & possibly blackish
water

Section $1\frac{1}{4}$ miles N of Norwood
On a new road $1\frac{1}{4}$ mi. N of
Norwood is a new exposure of
black shales 14' feet above the
lake and on the roadside.
About 13' feet below the
black shale are two layers
of gray shaly ls. The upper
layer is crowded with
Schizophoria and Actinoptera
Below this is a layer with
large Pentamerella and
Trilobites. These beds aggregate
about 15" (guess) and overlie
the dolomite layers we called
the top of the section. There
must still be a gap between
the black shale and the
Traverse.

The Traverse rocks have
a dip of to the SW as high
as 10° . The black shale
is about horizontal. The
difference in dip between the
two suggest an angular
unconformity.

1876

121

Ehlers has Styliolina above
Square Bay at old mill
N of Payton Cr. makes
Square Bay & Edmunds

Send Mrs. D. reprints

Aug 31

Shore at Bayview

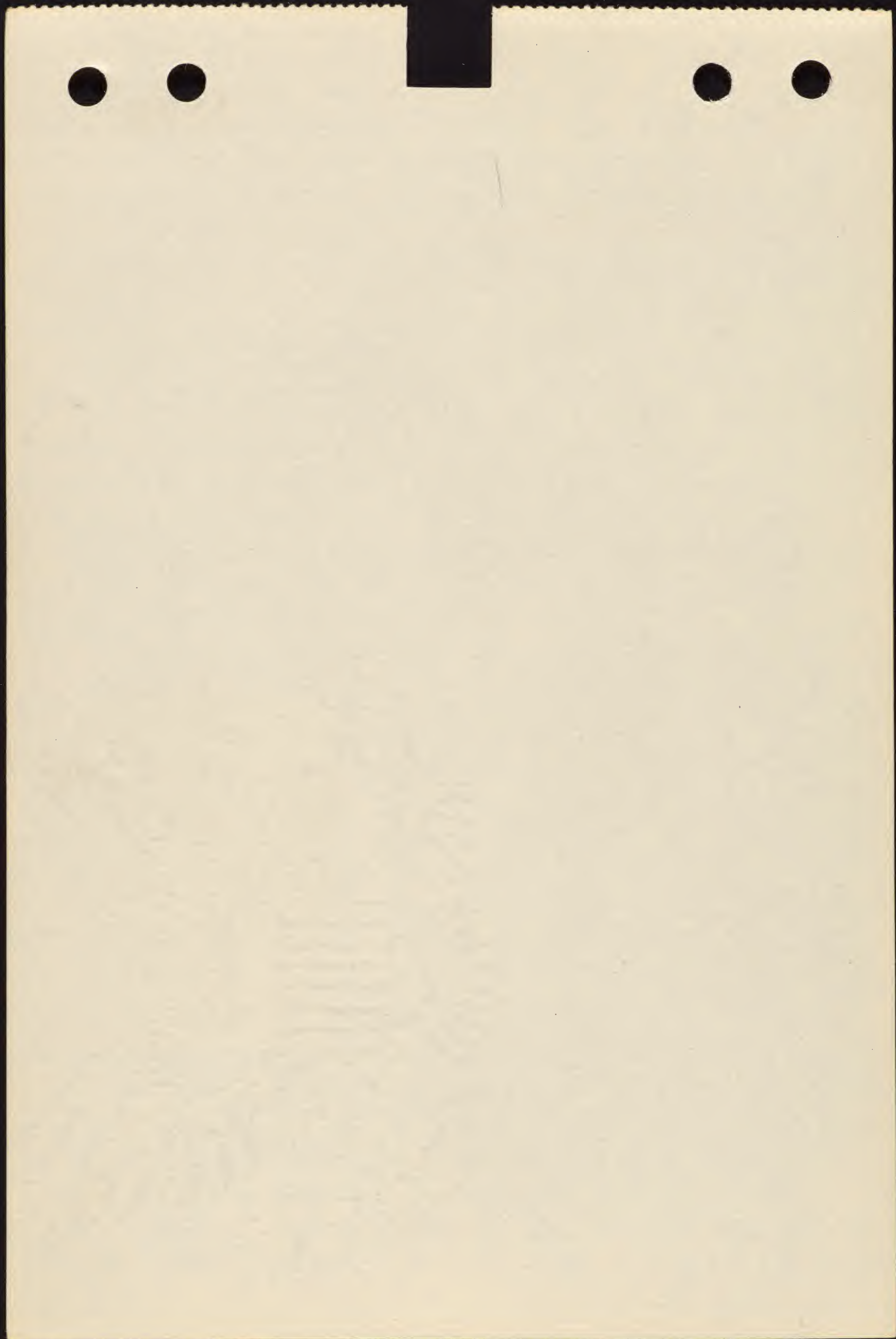
Beds with anhydrite come
about 1' or less under a
blue shale (Pohl bed 6). The
~~beds from~~ fossils from
the gravel are from the
contact of the upper
blue and limestone with
anhydrite xls. Must overhaul
my specimens at Washington

The beds with anhydrite
contain many fossils.
Corcardium a, Camerophoria
(small resembling gaimer),
Pentamerella large, snails,
Trochonema, etc.

Dumose
bed

Bed 6

Is with
anhydrite



122

Loc 21a

Aug 31

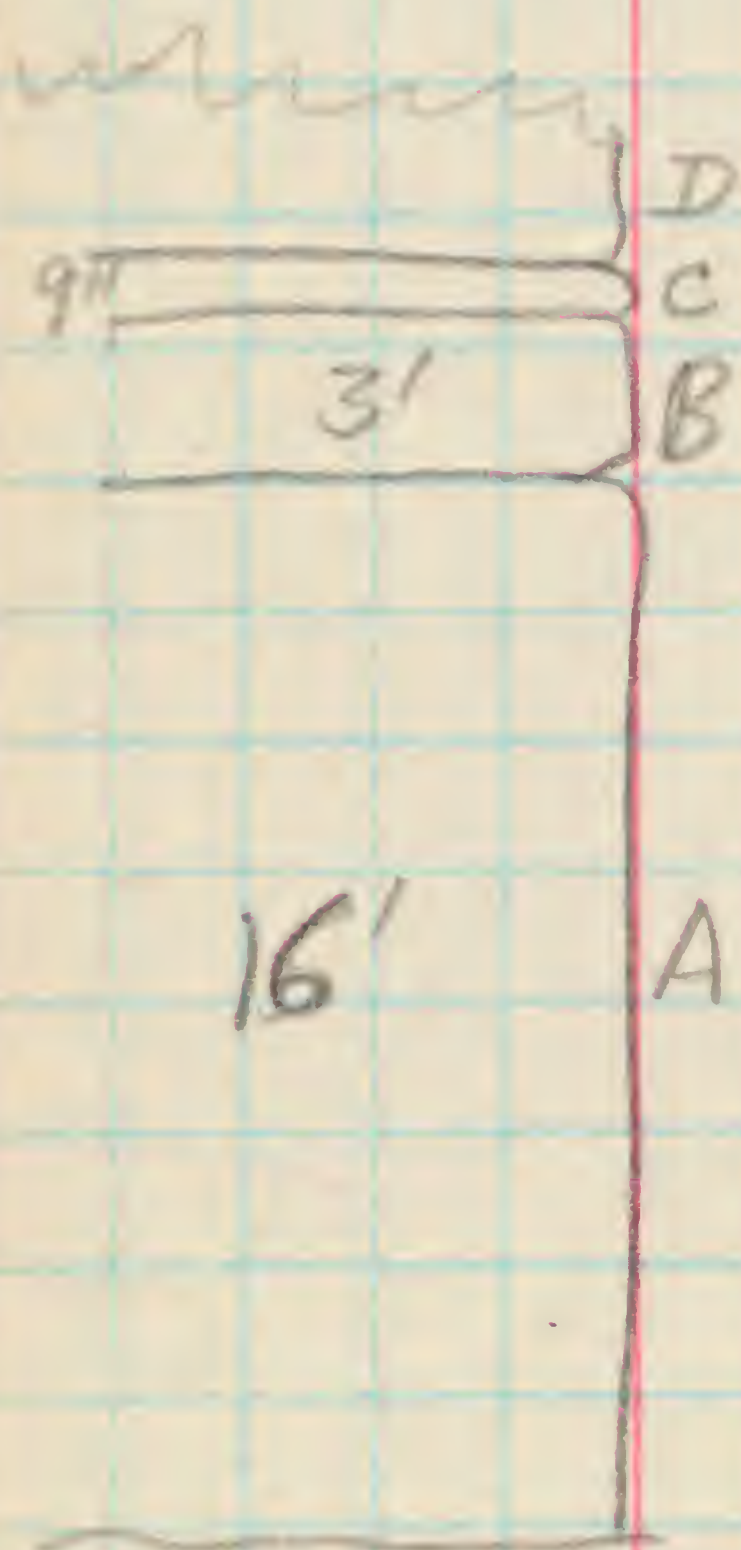
1877

Section at Junction of Hys. 31 + 131.

A - brown porous ls. become lighter & denser at top.

B. S. petoskeyensis bed probably same as at base of "Pohl's bl" which is the "Mud Lake Qy". Blue shale, fossils loose.
C. Limestone about 9"

D - Blue shale with many Cyrtina alpeanaensis and S. petoskeyensis



$$\begin{array}{r}
 152 \\
 \hline
 96 \\
 169
 \end{array}
 \qquad
 \begin{array}{r}
 152 \\
 \hline
 96 \\
 169
 \end{array}$$

1878

123

Sept. 1
all day at 4-mile dam.

Sept. 2.

Elevation on Killians Terrace
(A57) about $5\frac{1}{4}$ mile N of
Alpena on Long Lake Road
680'

Upper Genshaw on Long Lake Rd
706'

Top of lowest ls of Genshaw on
French road is 733'

Top of Killians on French Rd 772'

Elevation at ~~section line~~ road
corner at 4 Mile dam is 645'
This is about the top of the
lower cinnoidal ls. of the
Potter Farm.

4-mile dam reef is 615'

Elevation on ~~Killians~~ Rabbitan
farm exposure of Genshaw is
710'

Wessel Rd Killians 675'

1879

124

Limestones on 7-Mile dam
just below the ss. contain
C. coronatus, *Sp. pennatus*,
Camarotoechia and *Platystrophia*. Presence of
C. coronatus suggests a possible
link with the Norway Point

Sept 3

Thunder Bay Bay

A - Alpena

B - Dock Street

Soil

C. - 20'-30" gray granular, fine
grained ls containing
Dinorthis, *S. divaricatus*,
Reticularia, *Camarotoechia* etc.

20-30"

D. - 5'-6' variable ls, brown,
crinoidal, many corals and
platy stromatopora. Bryozoa,
Camarospira, etc. cln loose
pieces cln saw what cl thought
to be *C. coronatus*. Top is
nodular and sandy.
Stromatopora is abundant in
the top layers.

125

Chloro has Brontenos from
W. Virginia 1880

Sept. 4, 1936

Rockport Bay

F-389

E-27" yellow-weathering

brownish earthy ls. probably blue
gray when fresh

D

containing shale pebbles, cup

C

corals overlain by blue shale
(bed F). Bed E contains large

B

Prismatophyllum, large Atrypa
but not as large as that in
the Geneshaw.

A

D- About 10" blue shale with
Prismatophyllum and cup corals

C- 27" of hard blue gray
brown to yellow-weathering ls.
containing many Prismato-
phyllum, Favosites and large
Atrypa.

B- 2" blue shale containing
Cyrtina, sp. mucronatus like
that of the Ferron Pt., a small
Camarotoechia C, and many
Fenestella in upper part

Soil #G

Blue sh #

34"

27"

10"

27"

26"

20"

Ferron
Point

Rockport

1881

126

A - 20" - consists of 2 beds of ~~bluish~~ dark gray earthy limestone separated by 3" of shaly ls. The lower bed is 10" thick and the upper one 7" contains large *Atrypa*, huge *Prismatophyllum*.

bed F - blue shale abounding in byozoa, suggests bottom of A.P.C. Cy.

bed G. 6" of limestone at top of section

B - lower part bed B seems to have many of regular Ferron Pt thinbeds such as large *Spirifer*, *Atrypa* etc. Preston took 3 *Schuchertella* from this bed.

Ledge of Rockport is 640, from 620

Ledge of Genshaw on road to Rockport is recorded at 670. Barometer at Long Lake read 660

Ferron Point fossils go as high as top of E.

127

Sept. 4

1882

an exposure of basal Alpena
just above the Killians was
found *Chonetes coronatus*

Sept. 5

Abandoned shale pit Alpena
Portland Cement Co.

Send Dr. Ehlers small
Pleurodictyons from Bell sh.

Important

Look up ownership of 1926
collections

Ask for Permian of Sicily

" " Tasmanian specimens

" " *Schizorhynchus* (*Dolichorhynchus austriacus*)

" " *Meristospira* (Topotypes).

158

Gerd. Ehlers Archaeocyathus
Homalonotus (Dipleura) 1883

D. M. Ehlers, 1609 S. University Ave., A.A.

Deep Run

Heavier
beds
30' ±

A - granular, brown-gray, fossiliferous ls. with *Nucleocrinus vermiculi* at top.

8-10'

D

B - 6' ls. brownish gray massive with many sp. like *Lucasi* and large *Leptaena*, *Schizophoria*
~~*Leptaena*~~ ?

C 4' ± brown, fine-grained hard ls.

D - shaly ls + sh with *Martini*, *Leiorhynchus* etc.

4' ±

C

Del.

S. acuminatus
6'

on

B

Onion.
Columbus

A

2

River level

01937

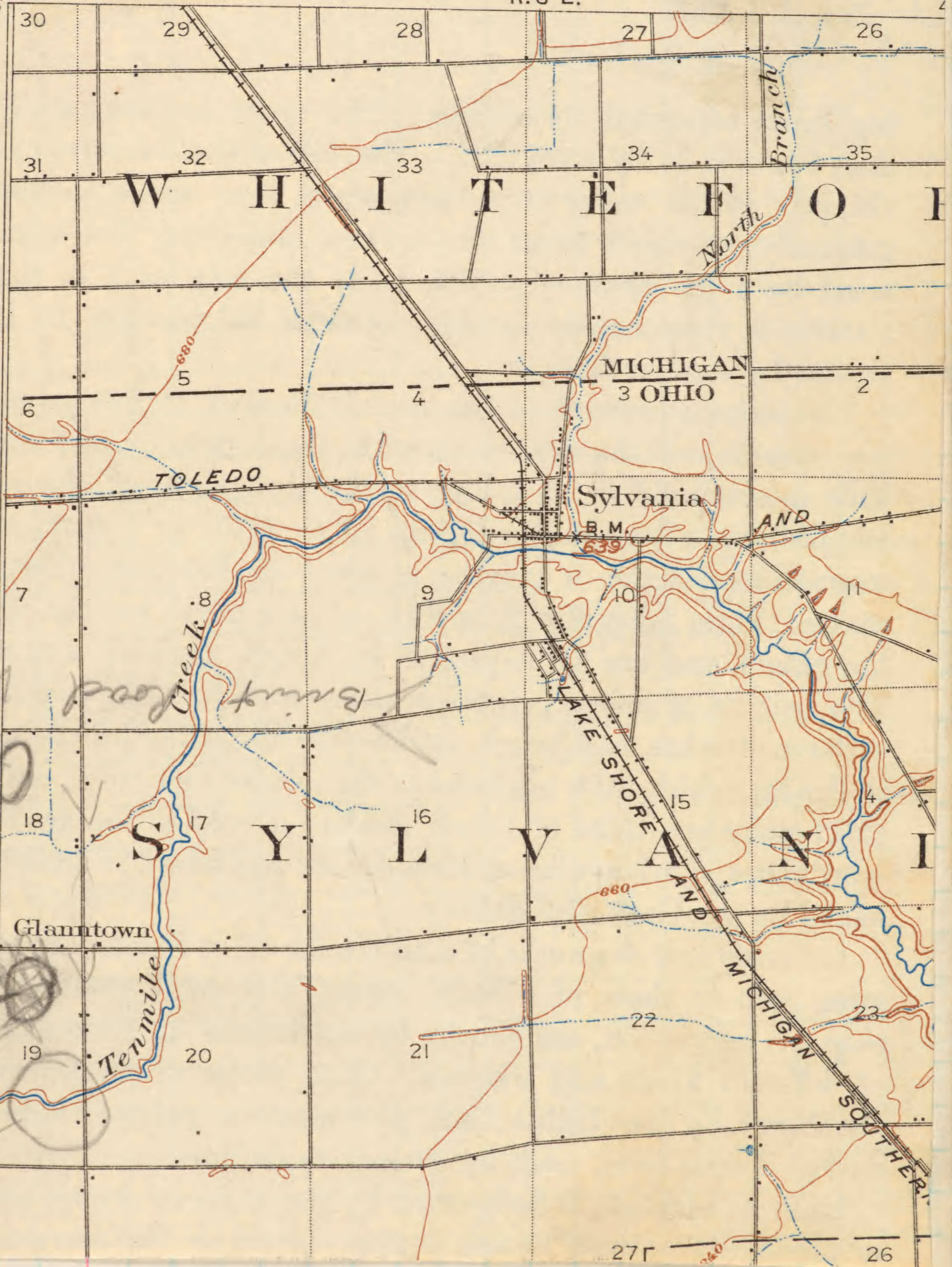
$\frac{1}{2}$

$$\begin{array}{r} 370 \\ 2.7 \\ \hline 0.6590 \\ 940 \\ \hline 9996 \end{array}$$
$$\begin{array}{r} 368 \\ 2.5 \\ \hline 1840.25 \\ 736 \\ \hline 920.25 \end{array}$$

83° 45'
41° 45'

R. 6 E.

T. 8 S.



27

26

①

June 3

1884

10-mile Creek

Silica shale with *Sp. bournockii* in both banks at 200-245. Shaly ls band with small *Clonites*, *Sp. mucronatus* and *Rhipidomella* at 245. This is the *Rhipidomella* bed of the Upper Silica 244-245 - nothing

245-505 blue shale with *Camarotoechia* *Sp. pennatus* (sparsely fossiliferous)

~~505-535~~ blocks with *Leiorhynchus*

~~543-535~~ 535-570 grey shaly ls with small *Stropheodonta*, *Rhodostrophia* *Schizophoria*

At 570 shaly blocks are mixed with dolomites with white chert + corals.

at 645 corals not present in dolomite. At about 700 hard blocky dolomites appear

At 757 these blocky dolomites appear in bank about 4-5' above floor of creek dipping $4\frac{1}{2}^\circ$ Crinoid here

757-928 The dolomite is exposed. At 928 comes a bridge over creek

at 976 the dolomite passes under bed of stream

(2)

~~Dip + strike here~~ 1885

Working downstream

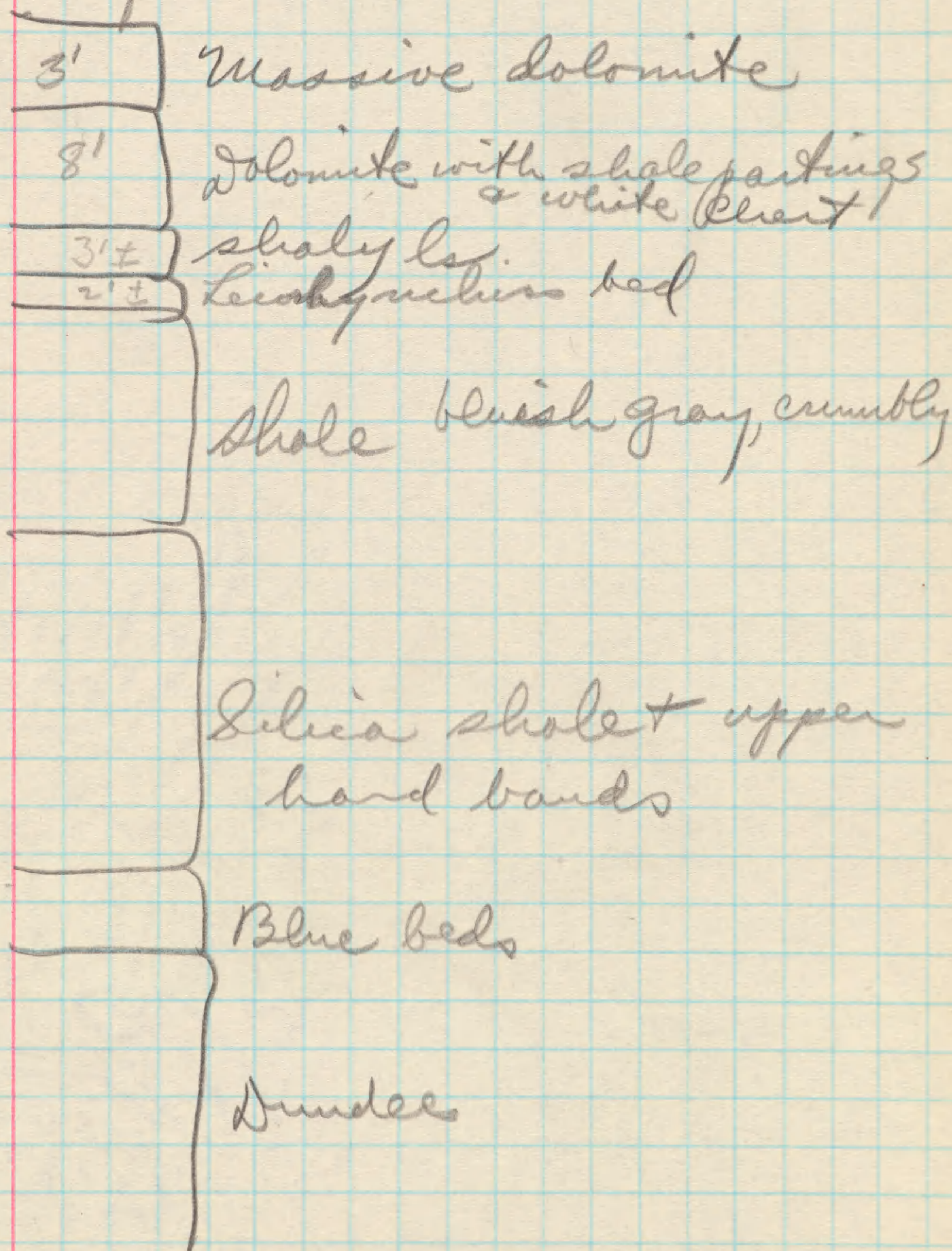
Dolomite goes under stream
57 paces above second
bridge upper layer massive
with much mineral. 60 paces
downstream is following section
then

3' dolomite heavy bedded, ^{light gray} rusty &
pyrite-bearing at top.
2-8' 2' ^{dark gray} irregularly bedded dolomite with
shale partings & corals
stream.

The outcrop disappears 130
paces below bridge. The
dolomite separated by sh
is about 5-8' thick and I think
belongs to coral beds just above
the Leiorhynchus. Between 160
and 240 there is much
white druse in the dolomite.
These may represent lower
beds perhaps 3' making
the total 10-11'. About 300
appear shaly beds with ~~sh~~
bryozoa Schizophoria, small
Strophodonts, & Pholidostrophia
353 Leiorhynchus bed.

(3)

The Ten-Mile Creek ¹⁸⁸⁶
section skeletonized is
as follows



4

June 5

1887

Collected at East end Pet. Port.
Cement Co. Ay. Lower Blue.
Collected Upper Blue at Bay
View.

June 6

Charlevoix Rock prod. Co. Ay in
morning, Bell Ay in afternoon

June 7

Collected big *Styra* bed in
morning.

Afternoon visited west side
of Pet. Port. Cement Co. Ay.

Visited 14c or at any
rate an abandoned Ay. |
about $\frac{1}{2}$ mile west of west
end of P.P.C. Co. Ay. and about
 $\frac{1}{2}$ mile east of the Bell Ay.
Geographically this locality
fits Pohl's loc. 14c but we
could not check his section.
Measured from lowest rock
exposed there are 17' to a
band of dark shale abounding
in small *Strophodontas*.
This is not the "lower blue
shale" but a bed of dark
shale about 3" thick. Above
the shale there about 13' of

1888

5

rock exposed. The limestone is brittle, fine grained in the lower part. More massive above. The section appears to be all Gravel Point, and I think all below the "lower blue sh."

Send Sloss Bradley Brook
Prismatophylax

This 14c quarry is exactly 2.74 miles ^E from the X-roads at Bayshore. And about 1/2 mile west of the abandoned Bell quarry.

To reach Bell Co, take Hy. 31 east from Bayshore 2.3 miles to a wood road leading north. Follow this road to Co.

6

June 8

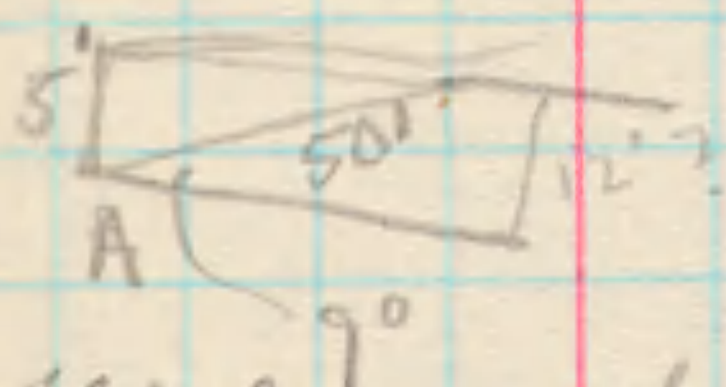
1889

Section exposed along road
N mile from black sh
outcrop on road N of Hornwood

A - 17" pinkish, fine grained
smooth, subbituminous, saplike ls.
Upper surface very irregular
Magnetic reading $N 56^{\circ} W 90 S$.

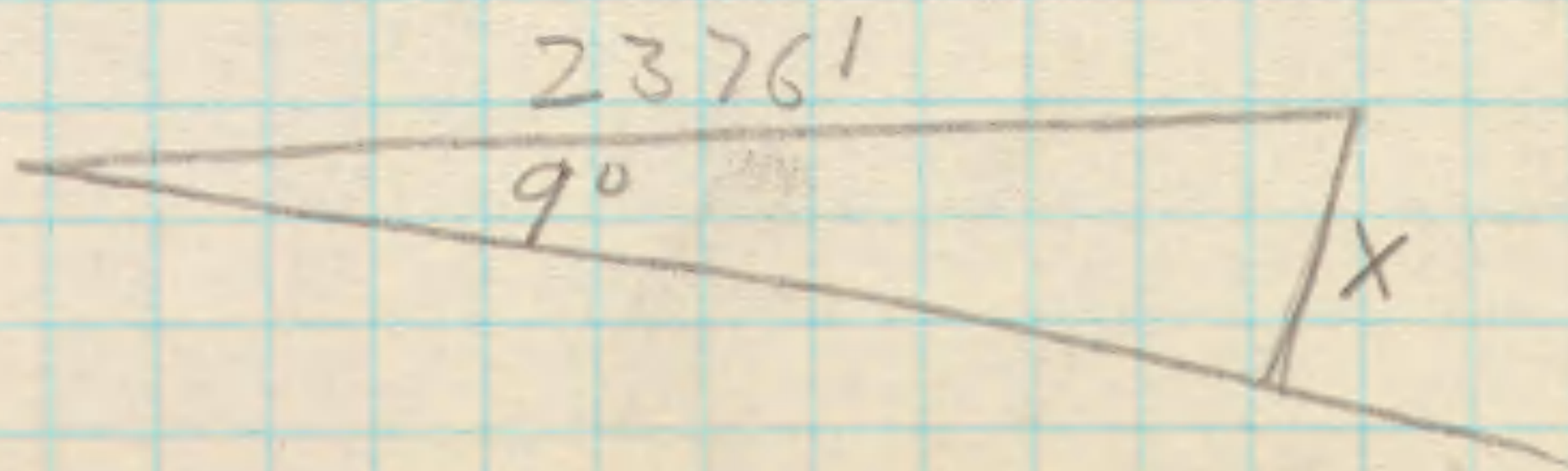
B. - blue sh same as
under Pohl's *Atrypa* bed
contains *Heteroschisma*. About 12'

C. Pohl's *Atrypa* zone
about 2' exposed. *Atrypas* in
shaly lower part, digitate
Favosites above



Thickness of
blue sh

Thickness from blue sh to Black



First right hand turn in Nov.
10.65 - turn to Norwood.
9.5 - Black sh.
9.05 - bluish.

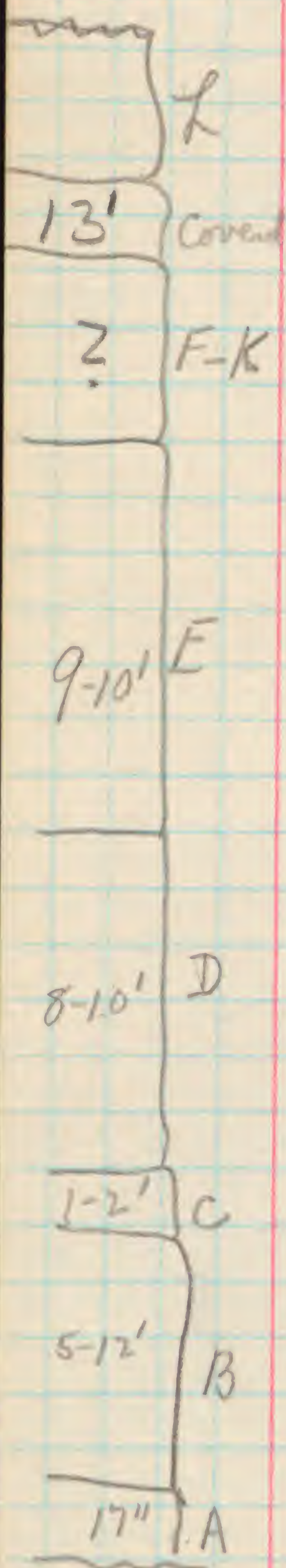
$$\begin{array}{r} 5280 \\ .45 \\ \hline 26400 \\ 2120 \\ \hline 2376.00 \end{array}$$

(7)

June 9

1890

Collected and studied section
North of Norwood.



A - Smooth pinkish ls. 17"

B - Blue shale with *Heteroschisma*
not less than 5' nor more
than 12'.

C. *Atrypa* bed of Polul. One to
2'.

D - Thin platy limestone with
layers of brown chert. Fossils
few mostly corals, worm
trails. This bed is 8-10' thick.

E. Heavy bedded dolomite
with large snails, impressions
of corals (*Cladopora*)? 9-10'+

F-K - 6 beds of shale
covering an interval on the
beach of about 227' (I would
guess not more than 4 or
5'. These beds contain
Schizophoria, *Pugnoides*, etc.

Covered - About 10-13' above
the *Schizophoria* bed.

37' - 48'

(8)

Structure

1891

The black shale is exposed 1.1 miles from the turn ^{near the shore} at Homewood. ~~There~~ are exposed 3-4 ft of black shale. For some distance along the road and on the slopes facing the beach large masses of bituminous limestone are common. When fresh they are hard, dark, fine-grained and much rounded from solution. These contain a Naples (Squam Bay) fauna. They probably are not a single bed but are hard beds in the shale.

The first exposure of Inverse rocks north of the black shale is on the road 1350' north of the black shale. This exposes the dolomite with *Cladopora* impressions and the section is intermittently exposed to the blue shale which is about 0.45 mile north of the black shale.

The blue shale is exposed on the shore not far ~~south~~ southwest of its exposure in the road. It is exposed in a flat part of the beach opposite

1892

(9)

Strike on shore N of
Howard N 30° W.

a bluff of the cherty beds. The Atypa bed forms a low ledge in the beach dipping south and it can be followed to the lake where slightly higher beds can be seen dipping west and north west. This appears to be the center of a dome, its ~~highest~~ lowest exposed inner portion being the blue shale on the road. The succeeding beds can be followed south along the shore where their edges show on the beach and good sections in the bluff. The northernmost part of the bluff has a dip of 4° to the south. The upper dolomites are present in the beach near the black shale. Here they appear to flatten out, change strike to about NE and swing south to surround a small basin near the black shale. ~~These beds are~~

At the black shale the road descends to a depression but rises to the north up the dip of the Traverse. On the shore opposite (just W.) of the black shale the dolomite appears to bound a depression in which beds F - K are

1893

(10)

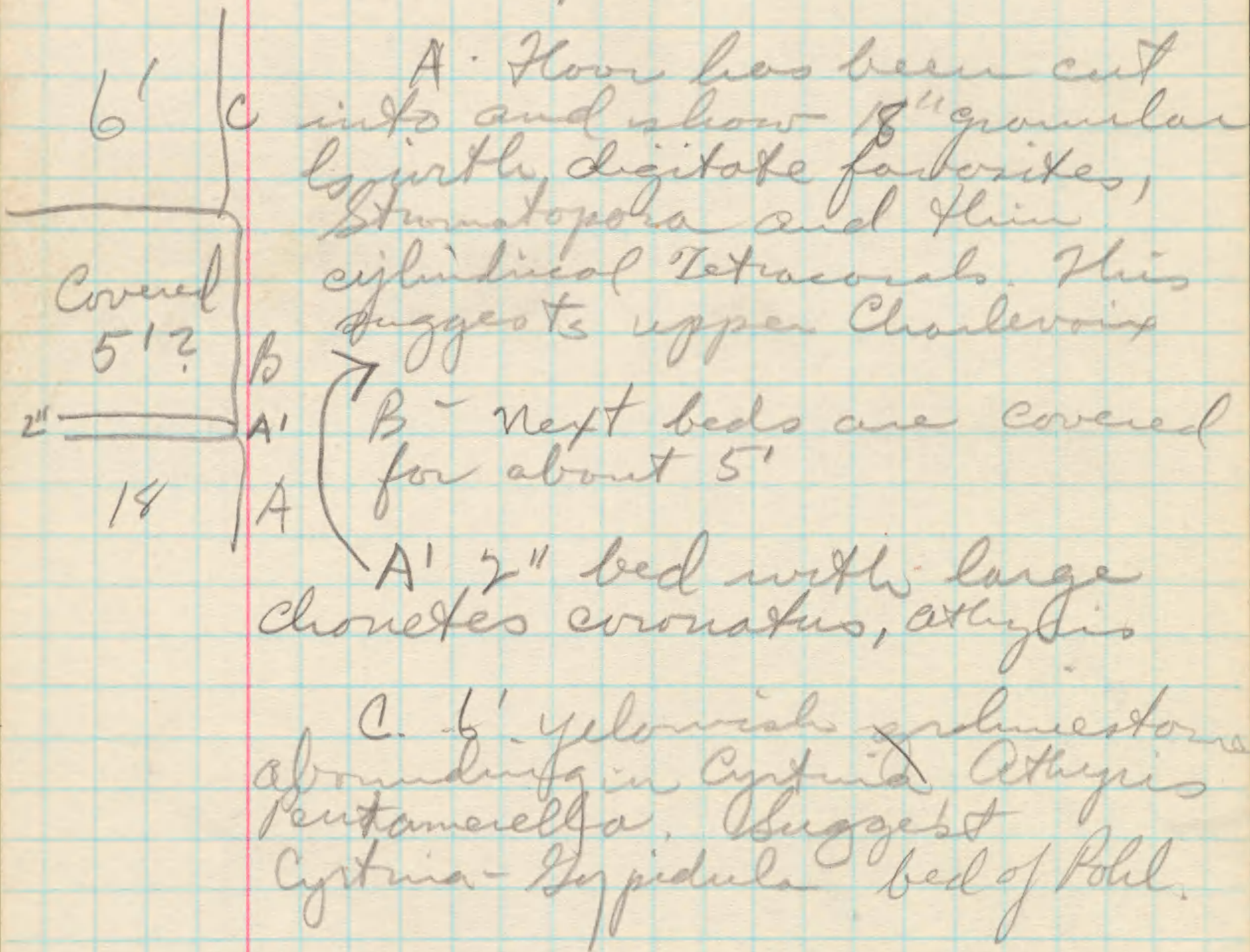
found. These beds strike $N30^{\circ}-40^{\circ}W.$ and are only found in this small area.

The lowest bed of this sequence is a greenish buff limestone 2-4" thick. This is followed by shale? Bed 3 is a somewhat crinoidal ls. with *Leptaena* and *Leiorhynchus*. 5. contains many *Actinoptera* and *Schizophoria*. 6 is a shale? with *Pugnoides*. There are about 13' to the black shale. This 13' may be all or part black shale.

(11)

June 10 1894

Loc. 12 - R.A. Smith Test Dig.
Lower bed dips 13° S and strikes
N 80 W (mag).



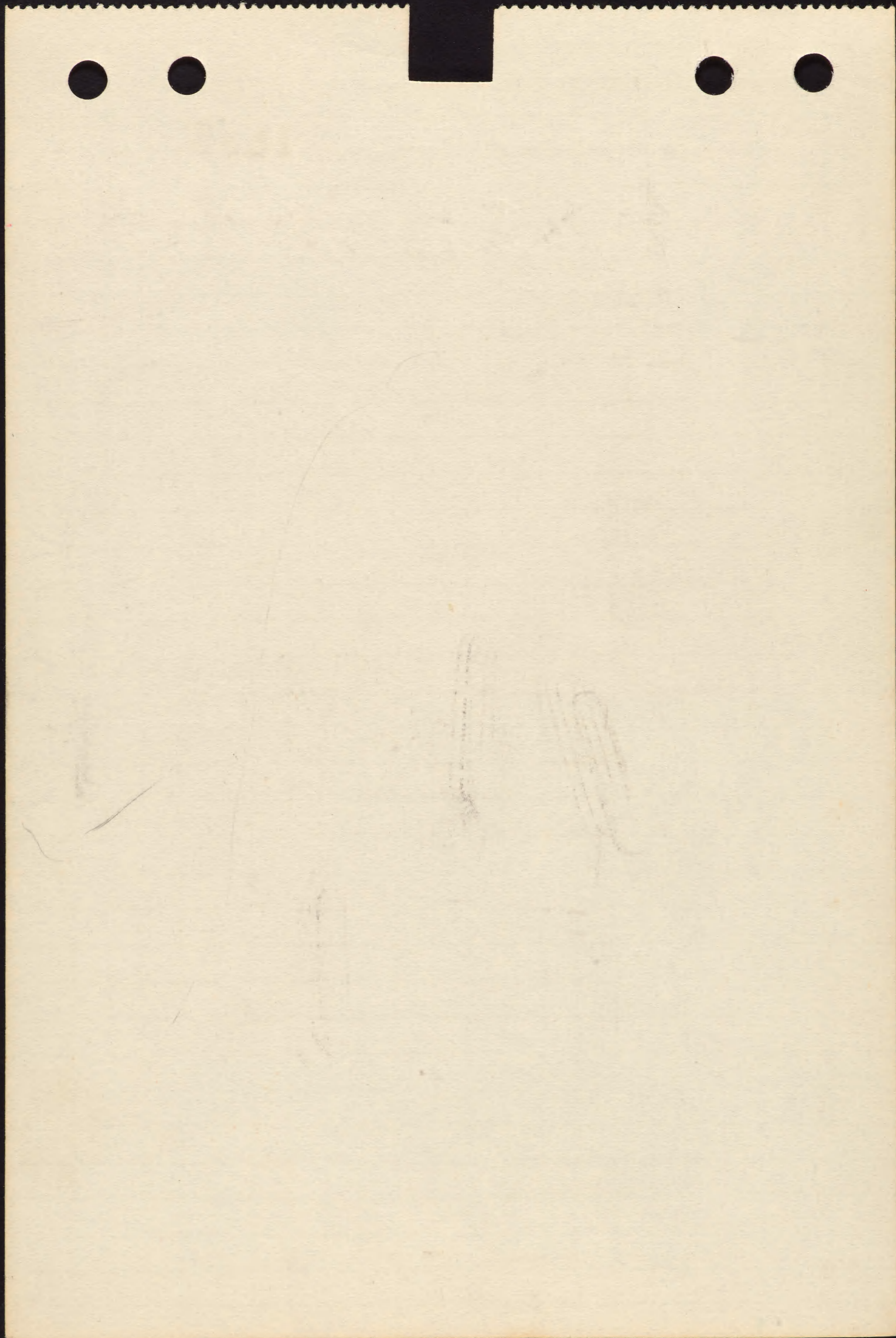
(12)

junction 131-31. 1895

About 5' of brown ls in ditch overlain by 2' yellow weathering blue shale with many *Pentamerella*. This is overlain by about 1' ls. All dips 3-4° toward

about 1/2 mi.
76 - pit, N of center of 76 in Norwood. Only rock in place is a cream colored smooth ls. containing crystalline spots and finger-like corals or *Stromatopora*. Dolomite pieces were seen loose. This is same kind of rock as that on shore just north of Norwood. Squaw Bay hard-heads were not seen.

Charlevoix rock Products Co. should be located in SW 1/4 SE 1/4 sec 24, west of Charlevoix



(13)

1886

June 11.

Went to Bell Bay and came out on a line due S from extreme W end of Bay. We landed on the highway about 1000' (920'-999') west of the entrance to the quarry at the road. The ^{W end of the} quarry is thus due N of a point 2.1 miles East of Bay Shore corner.

June 12.

Mud Lake exposure is 0.4 mile on Hwy 131 from junction with 31.

June 12'

A. Gray crumbly shale, staining with a small smooth *Athyris*. Also small *Strophodont* + large *Spirifer* 6"

3' } B
6" } A

B. Gray x-line ls. with *Pugnata* - *Phyllina*, sp. *macronatus*, large sp., large *Athyra*, *C. coronatus*.

to NW corner A + NE cor. S, 34 N-6E at Orchard.

1897

June 13.

(14)

This is same
as antelime at
Norway Pt. Dam

SW $\frac{1}{4}$ SW $\frac{1}{4}$ 4 - 31 N - 8 E about
2.2 mi. N of Poor Farm
on French Road. granular
ls. with sp. granulosus and
Camarotoechia abundant.

at intersection of French and
Turkey road

Collected also at APCo Sy. Long Lake Rd.

June 14

Collected $\frac{3}{4}$ mile downstream
from 4-Mile Dam + at 4-Mile
Dam.

About 10' below the section
corner at 4-Mile Dam and
in the field to east of the
corner is a ditch in limestone,
granular with Cyrtina a
small Athyris, small Pentamerella
The ls forms a flat east
of the section corner and
underlies the level field
through which the power
line passes. This is
undoubtedly one of the
lower Potter Farm ls.
About 3' of ls exposed.

02.45
00.7

(15)

June 18

1898

About 1 $\frac{1}{2}$ mi NW of Bolton
SE $\frac{1}{4}$ SW $\frac{1}{4}$ 5, 32 N-7E.

Small Qy with 2' of crinoidal ls
separated by 3" of shale from
5' of crinoidal ls. A small sink
about 100 yds N of the Qy
exposes some 10' feet more of
rock. not collected.

J. 18¹

0.55 Ann (NW) of French Rd &
Truckey School intersection
gray cherty ls. with *Camartoechia*

J. 18²

Cherty ls. with *Cyrtina*.
Camartoechia, *Strophodontia* etc.
This ls. is exposed from French-
Truckey road intersection SE
to Alberta City line where there
are exposures on each side of
the road, and behind Grove
Farm.

16

June 18-19

1899

Potter Farm

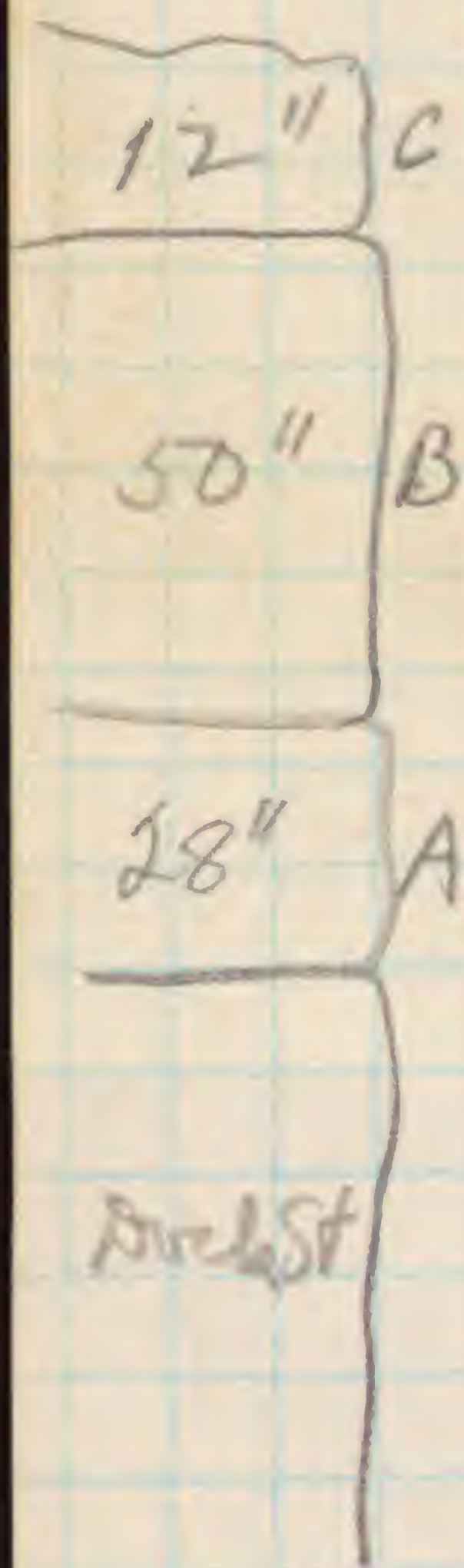
Cemetery pit shows two faunas
a lower one characterized by
large wide-hinged *Strophodonts*
and an upper one with small
fine-ribbed *Strophodonts*,
Camerozonia and *Crinania*. This
upper fauna underlies a
limestone bed possibly 1 foot
thick. This is overlain by
shale with large *Crinania*
and *Cyrtina alpestris*. This
is well shown in about the
center of the pasture between
the cemetery pit and the road.
here a ditch is cut through
and shows in the center the
beds with *Camerozonia* and
small *Strophodonts*. Then follow
a thin limestone and then
the beds with large *Crinania*
and *Cyrtina alpestris*. The
latter bed is followed by
the section along U.S. 23.
I would guess the Cemetery
pit would add some 10' to
the Potter Farm section.

17

June 21

1900

Section above Dock St. Clay
Thunder Bay Cy



A - 28" of hard, gray finely granular ls. with sp. venustes, Camarospira etc. These occur in the beds from 22" down.

B. 50" of granular gray ls. with dark brown thin shaly streaks and abounding in Grabs and plates of Stromatopora.

C. About 1 foot ~~yellow~~ gray nodular ls. with irregular layers of yellow sandy shale Striatopora abundant, Athyris, large Sprifer.

7/6

50

18a

June 22

1901

①

Genshaw about 2 mi E of
Oquesoc Falls on U.S. 23.
3-4' conoidal gray ls. irregularly
bedded with black sandy
partings. *Pentamerella* big
Spinifer, *Strophodontas*

No. June 22

About 1 foot gray Genshaw
with large *Pentamerella*, *Atypa* etc.
In a dry water course to west
of road are 5-10 feet of this rock.
Large *Pentamerella* is abundant.
This is probably the same as the
rock at Tower

6 = June 22' Falls at Rainy River. - 10-15'
of Genshaw in 2 anticlines,
one on each side of river.
Fossils common

Big <i>Spinifer</i>	<i>Cyrtina</i>
2 big <i>Pentamerella</i>	<i>Atypa</i> (with <i>Strom</i>)
<i>Pholidostrophia</i> (big)	<i>Strophodontas</i>
<i>Prochistella</i>	<i>Prismatophyllus</i>

This exposure is essentially
same as June 22, and I think
both tie to the beds at Tower

1902

18

June 22nd - 1.45 miles from N 95
 Gray ls. with sp. micromatus,
 Lityras, large sp. Black waxy
 partings. Probably Rockport

Black Lake

- A - Smooth gray ls.
- B - gray shale
- C - 3" gray crinoidal ls.
- D - 9-10' shale
- E - Cliff of massive gray, crinoidal
 ls. with large sp., Prismatophylla
 and large Pentamerella about
 15-20' This is Genshaw

15-20'
 Genshaw

9'-10'

3'

Rockport
 approx 27'

The Genshaw and the shale
 appear on the shore of the
 lake 500 paces ~~from the~~
 northeast along the shore
 of the lake. At 500 paces the
 top of the rockport is at
 the level of the lake.

19

Shanty Rapids

1903

Few feet of ls. combining upper & lower Rockport types.

Road in sect 34 -
1st Exposure of 2 or 3' of granular
circular Genshaw with large
Spinifer. ~~Up the hill~~ This exposure
is about $\frac{1}{4}$ mile from intersection
with road on N line of sec.
About .2 mi S & up the hill, on the
brow of the hill is Genshaw with
large Pentamerella, dipping S.
About .2 mile over hill & forming
south slope of hill is steeply
dipping black dense ls.
Under this is perhaps 1 foot
of shale with Stropheodonta,
Clonites, Schizophoria, large
Unio spinifer. This shale
suggests that just below the
Killians & the black ls.
suggest Killians

The exposures are 1, 2, 3.

1904

J22³
20

Exposure on US 23 1 1/4 miles
west of the City line (west side)
of Tower

14" C
B
3' A

A - Dark limy, friable shale
with *Cystina alpenensis*, and
small *Strophodontia*. 14"

B - Dark gray to black ls.
with *Pholidostrophia*, *Chonetes*,
large *Spinifer*

C, Dark shale ?

This section is same as that
on hill (Exposure 3) one mile
north of Tower and definitely
places this section at Tower
Dam in the Genshaw. This dark
limestone (Bed B) may be basal
Killians, the bed A is certainly
highest of Genshaw.

2/

June 23 1905

Qry SE of LeGrand

crin

7 1/2'

Light gray ls, scattered conical columns
large Pentamerella of Afton type
big Stroms.

6-7'

Dark gray ls, with sooty partings
D. Pinnatophyllum, sheet like
Stroms present - like Rockport
lower contact irregular

5'

C massive brown gray ls.

11'

B. Brownish gray ls, with pitch, breaking
into flat plates in lower 3-5' more
massive above

3'

A - light gray, porous

covered
3'

This section combines rocks
of Upper Rockport, lower Rockport
& Genesee type.

22

June 23'

1906

About 2' of platy gray ls. in ditch.

Gonphoceras, Declinella, big sp.
 Microzoster, Selinophoria
 0.2 mile ~~far~~ east of 1st S road
 W of Segrand.

June 23rd

Lower shaly beds with Productella
 and small Strophodonts suggest
 Genshaw. Upper dark ls on hill
 suggest Killians. Near their base
 I found Capitula of alpenensis type
 suggesting upper Genshaw.

Afton Qy

Rough section

Pentamerella
 beds

sandy beds B

gray beds
 of upper
 Rockport type A

23

Section in Marvin Bay 1907

18 1/2'

massive bed 4'

2'

2'?

2'-

Massive heavy-bedded ls. with imoid columns, brown gray, *Pentamerella* of Afton type - Correlates with *Pentamerella* bed at Afton. Contains *Pisematophyllum*.

C - light gray fine grained ls with large Stroms + molluscs

B - Covered

A - Black, sooty limestone. Possibly correlates with B. of Afton Bay and D of Bay SE of LeGrand

1908

24

Beebe School

1st rock N of school is 1000 paces
from intersection: About 2 feet
gray ls. with crinoidal fragments.
Strophodont, *Pentamerella*,
Strom. (small), *Cyrtina*, *Productella*,
Pholidostrophia, small *Schuchertella*

1000 - 652 paces covered
~~652~~ At 652 - 602 - Gray ls. with
an abundance of ostracods
overlain by porous ls. with
Cypriocardia, corals. Above this
are limestones, as shown by
loose blocks, with *Schizophoria*,
Productella, *Cyrtina* & *Pentamerella*
All told there are about 6' exposed
here

602 - 416 - covered
416 - ~~276~~ - gray barren shale

Ganshaw in Pigeon R. 80' below
Sorenson Ay.

602
186
416

C

2

June 24 1909

25

Lower Alpena with *C. coronatus* is 0.35 miles S of Killian's ledge on Long Lake Rd. This lower Alpena is 1.1 miles south of west turn ~~at~~ below Long Lake

June 24¹

76.55
69.05

1.5

Black ls. with large *Spirifer*, *Oriskanyella*, *Club-like Favosites*. This is Killian's or black Genshaw 2.5 miles on 638 from US 23.

J. 24²

Genshaw with big *Schiz.*, *Pentamerella*, *C. coronatus*, etc.

J. 24³

2.75 mi. west of turn. Genshaw with many chonetes.

J. 24⁴

Some 8-10' gray ls. abounding in globular *Pentamerella* of Afton or Dover type.

J. 24⁵

Dark Gray to black sh + shaly ls. with *Athyris* & *Cyrtina*, same as Killian's S. of Posehn. This is Killian's with many digitate *Favosites*.

26

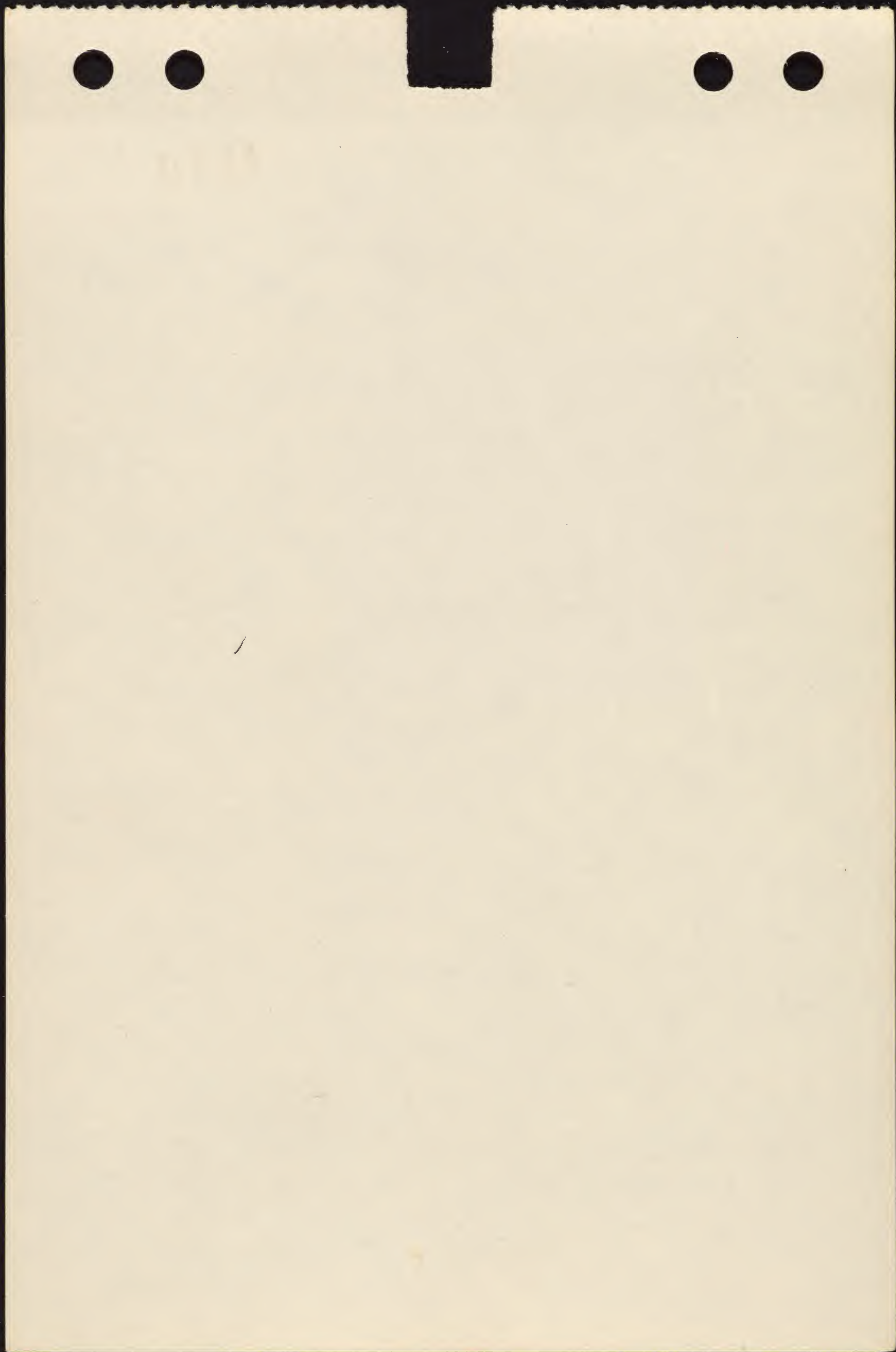
June 25

1910

Under ninth Ave bridge is in
river with *C. coronatus* &
many *Camastoechia*. Same as
June 13 and as Norway Point.

R. E. Wilson, Fire Chief

Mr. & Mrs. Will Stoddard
313 - 4th Avenue
Alpena, Mich.



1911

27 June 26- Leiorhynchus locality
on Hwy 23 south of Alpena is
about 17 miles south of the
city.

According to Mr. S. Ambocelia
~~June 27~~ occurs only in the Widdow.
~~132.90~~ Peculiar Microspirifer with
emarginate anterior occurs
in Widdow

Send Mr. Southworth
a Tully paper. Also
exploded fossils reports. Send
Mr. S. Athyris from Jim Beels.

156
40

137.90
16 63

154.53

(50)

Pennsylvania

1912

Loc. 1.

Pennsylvania 1937

Mexico member of Marcellus -
Behind church & school, north side
of Mexico - unfossiliferous thin-bedded ss.
and thin dark sandy shale suggesting the
Sherburne or Bernwyn of Onondaga Valley.

Loc. 2 - Section in vicinity of Huntingdon, Pa.
Oriskany appears on Hwy 22 about $1\frac{1}{2}$ mi.
west northwest of Huntingdon.

Marcellus ~~about~~ just east of road to
McConnellstown about $\frac{1}{8}$ mile east of
the McConnellstown rd. (Rte 22 at Smithville)
Black shale, fissile, but less so than
in N.Y. ~~Thin~~ Two thin bands of blue
gray ls. Upper one with small Proetus,
Ambocoelia, Parenka, Nowakia.
~~Below & upper ls.~~ Between ls.
concretions common, some as small
as peas, with crude radial structure

Loc. 3 - $\frac{1}{4}$ mi S. of bridge over Juniata
Huntingdon. 30-40' of dark gray sandy
shale, pencil cleavage, rusty weathering
white streak. Vitulina abundant,
other fossils scarce. B.W. says this
cut is near middle of Hamilton. Rest
of Hamilton along road to SE up the hill
Loc 4 - on Pa 26 - 0.3 mi. S of
Huntingdon Co. line, fine exp
of Onondaga, with Marcellus
exposed to S for a mile or
more

1913

Get location

Loc. 5 - Eichelburger town

Tully dips $67^{\circ} 5' - 33''$ Thick, nodular dark limy shale $15''$, shaly ls. $10''$, West Brook bluish limy sh with a, spinosa $7-8''$. Lower $25'$ contains Enamella, Echinocoelia, Hypothyridina.

Hamilton - about $75'$ - no Vitulina seen. fauna $2'$ below Tully is Elytha, Atrypa, Cyrtina, C. coronatus, Tridoleptus common throughout. W. of Eichelburger town on Pa 26 dip flattens as one goes down through Hamilton to Oiskany for one mile

Aug. 31

Loc. 6 - Just northeast of Hannah on U.S. 220 - exposures of black sandy ~~Massellia~~ ~~Hennrich~~ Burkett

Loc. 7 - Route 220 - about $1/2$ mi ENE of Julian - Upper Hamilton

Genesee

Shaly ls

+ thin ls beds

Massive ls.

Echinocoelia zone

Sp. Atrypa 3m

Loc. 7 - Curtin - Tully

About $35'$ of Tully limestone - Overlies a thick layer of Hamilton contain Atrypa, Athyris, Corals. which suggests the Sp. Atrypa bed of Clelland.

The Tully starts with sandy beds having nodules of limestone

N 46 E 26° N

1914

This continues for 3'. This part contains Echinocoelia, & Schuchertella

8' below top is a zone with A. spinosa. This is O.W.B.

C. amara was found near middle. In between these beds & above S. spinosa are shaly ls.

This locality is $\frac{1}{4}$ mile ENE of Curtin where a small stream from N joins the Bald Eagle
Dip & strike N46E 76° N. 37 paces over outcrop.

Lock Haven

Grand Tully section just W of only bridge across the Susquehanna River, N77E36° NW magnetic. About 185' of shaly ls. mostly unfossiliferous. Upper 15' to 20' contains fossils, mostly small encorals. A. spinosa said to occur here.

Tully on Williamsport post sheet, 2nd crossing over Susquehanna east of Jersey Shore. At 553 number on map. 200 I felt of Tully with many fossils at top. On Hwy 54 Pa. Excellent collecting in upper beds. On east bank of River.



1915

Large quarry in Tully in Jersey shore
right South of R in Porter East
edge Lock Haven sheet and just
west of stream in Dennison
Hollow and north of RR tracks
near Jersey Shore Sta on
N.Y. Central R.R.

September 1.

N 82 E 87 N

E

Hamilton

Tully

Bucket

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Harrell

Tully

Section 1/2 to one mile SE
along the railroad from Lamy's
Creek. Here the Tully appears in
two anticlines. The easternmost
shows Tully and Hamilton. The latter
is separated from the Tully by a gully
and some 15-20 yards. The Hamilton
is N 82 E 87 N which is quite different
from the Tully dip and strike which
are N 71 E 50° S. The Hamilton is
sparsely fossiliferous dark gray
shale with Bucanopsis, Pholadella
and Vitulina. The Tully is ~~about~~
exposed for about 175' horizontally
and is overturned a little to the
north. The Bucket overlies the Tully
but is crumpled. Then the Harrell
appears over the Bucket and
extends for some distance to the
west flattening and then rising
above the RR to dip southward.
Then a low anticline of Tully
appears after a short covered interval.
On the west limb of the anticline the Portage app.

Sept. 1

1916

On road from Pennsdale to Huntersville 2-3 miles N of Pennsdale, Hamilton and Dully. *Vitulina* occurs below the Dully about 10' and about the same distance below the *Vitulina* is a zone with *Leptostrophia* and *A. spinosa*.

Dully massive in lower beds becomes shaly above. *C. aurora* found in about middle of outcrop. Lowest Dully sandy below the massive beds.

Danville

Excellent section on S. side of N branch of Susquehanna about one mile SE of Danville on hwy 54 to Shamokin, Pa. About 35' of Dully N83E46°S. Dully massive but very shaly fossils rare, *Echinocollia* in base, *A. spinosa* near top. Top very shaly suggesting transition to Burkett. Below contact irregular.

Vitulina and abundant Hamilton fossils 4' below Dully.

Marcellus about 0.3 mile East of turn ~~to bridge to~~ in Riverside

1917

Sept 2

37.8

38.3

41.1

On US 15 just over Shamokin Creek on the edge of Sunbury. Massive sandy Hamilton grading down into dark sand shale of Cardiff type. This is exposed for $\frac{1}{2}$ mile to the bend of the road to the east.

At point where road hits RR again around hill at words Pa R.R. on map. appears Marcellus faulted down against Oriskany.

On Hy 15 Onondaga appears Onondaga on both sides of the little stream just N of Selinsgrove Junction. The stream is on the axis of ~~the~~ an anticline. The Onondaga consists of beds of limestone up to one foot thick separated by dark shale. There are two bands of black sooty shale. The ls is dark and both bl. & ls. weather to ash gray. Marcellus appears on N side of outcrop as black shale with brown streak but breaking into stout flat flakes.

Up the hill to the SW the Onondaga and Marcellus are again exposed. The O. is separated from M. by about 10" of micaceous ss.

1918

Hy 15 - opposite Hallowing Run.
See W. + Kiddle Hallowing Run section
Hy 15 about $\frac{1}{4}$ mi N of intersection
with road up Hallowing Run.
Sandy shale breaking into fine
long strips. Near bottom of section
is a green sh with many fossils
suggesting Stafford ls. The rock
comes ~~just~~ within 50' of top
of Marcellus.

Higher opposite Hallowing
run are swayer rocks with
Gilbertoceras, Vitulina, Turbidites.

Junction of Hy 15 + 225 -
Hamilton S side of road with
Vitulina, At elbow of road is
about 1' of Tully with Echinocelia
and above this (Genesee).

Dalmatia lies on Will's Creek
and just S of ~~city~~ village is
Heldenberg & Oniskany and ~~hill~~
Onondaga, up the hill appears
Marcellus with Turkey Ridges
so near bottom.

25
16
09

1919

Excellent exposures of
Montebello on railroad
at end of Fisher Ridge $\frac{1}{2}$ mile
N of 2nd small Creek N of
Mahantango Creek or about
 $\frac{3}{4}$ mi N of Mahantango Creek

The Montebello is heavy
bedded and conglomeratic as
with fossils occupying
planes of cleavage and Tredwellville
divisions. Willard regards it
as a sand bar.

1920

The Tully in Pa. thins from its maximum at Lock Haven and vicinity southward, westward + eastward. ~~At~~ The Susquehanna valley at Fiddlers Run there is only one foot of Tully.

The Hamilton along the Allegheny front appears not to be divisible into formations or members but seems to represent the whole of the Hamilton. The formation is mainly dark sandy shale throughout.

Vitulina appears near the middle of the mass and occupies many feet, at least 40 and perhaps more. As one goes northwest from the Penn. Hamilton he leaves the shore and the formation becomes more uniform. This is the off-shore direction. The coral reefs in eastern Pa. are Centerfield in the shore zone.

September 3 1921

Section on Juniata River on
by U.S. 22, ~~about 1/2~~ half-way
between Losh Run + Half-Falls Mtn.

A - Vitulina zone of Hamilton

B - Nodular, sandy + shaly
ls. with *Hypothyridina* near
top, *Echinocoelia* and *Leiorhynchus*

E C. - Bluish shale with *A.*
spinosa, *Leptaena*, etc.
West Brook fauna.

10 1/2 - 11 1/2 D D - Greenish gray to dark olive
with small corals + *Aulopora*?

3-4' C E Burkett - Separated from
Tully by dark gray to black
color.

2 1/2' B

Vitulina
zone of
Hamilton

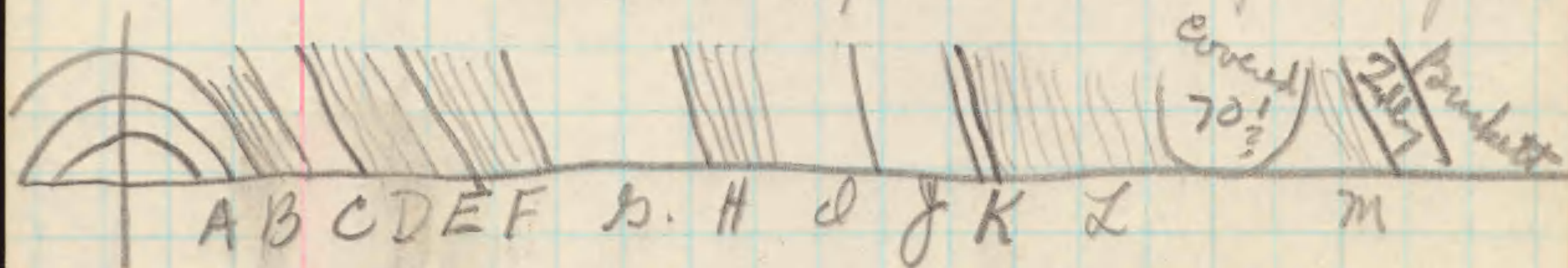
A The *Leptaena* of the Md.
Survey reported from the
Hamilton may be in the
Tully.



U822 - N of Tully loc. 1922

- A - 20-25' of Montebello ss.
 Beds as thick as 5' conglomeratic, with
P. flabellum. Base of succeeding bed sandy
 B. sandy sh. with *P. flabellum* 8'
 C. alternate heavy ss + sh. *C. vicinus* 20'
C. coronatus, *S. granulosa*, *T. canaliculatus* 10'
 D. sandy sh. Storm-roller at base 20'
 E. Heavy ss + sh. 3'
 F. sandy sh. *Sp. granulosa*. 20'
 G. Heavy bedded ss 45'
 H. Soft flaky sandy sh. *P. lista* 25'
 I. Thin-bedded ss. 20'
 J. Coarse heavy, massive ss. 20'
 K - brown ore bed 1'
 L - bluish sandy sh breaking to chips 80'

Bluish
color



M. - same as L - *Vitulina* at top 70'

New Bloomfield sheet

Section on S in Susquehanna, 1/2 mi
 SE of New Bloomfield

Vitulina zone in N bank of
 quarry, Tully in road at middle
 of quarry and at east end.
 Benesed on road and east
 end of quarry

1923

Tully about 8' thick. *Leiorhynchus*
+ *Estimococelia* + *Ambococelia*?
in sandy zone in lowest 18'
Atrypa spinosa 6' above
base with many WB species

811

Hy 274 about 1/4 - 1/2 miles NE
of Road between New Bloomfield
& Duncannon on N side of
small hill touching H in
wheatfield and SSE of W in Dark
Hollow. 2 miles E of inter-
section of Pa 34 & 274
Tully - Hamilton - Senessee
same as preceding with
Leiorhynchus at base.

Section 1/2 to 3/4 mi WNW of
Drongold on Sherman's Creek.
Montebello, 700' below top of
Hamilton abounding in
Newberrya + sp. *Tullius*? Whole
section along road to west

1924

Sections east of Hainburg

S. end of Deer Lake - $2\frac{1}{4}$ mi. NE of Auburn
on Hwy 122 into Sunbury
at Orangeburg, sandy lumpy
shales with *Glyptodonta*,
Cornellites, *Pandora* class *C. coronata*
suggesting Delphi $\frac{1}{4}$ mi N of
junction of 122 + ~~895~~ 895. To Auburn.
Oriskany on S side valley just
E of Auburn.

Walk track ^{NW} from Auburn
for $\frac{3}{4}$ mile, contact with Portage
about opposite mid. point between
A + D in Railroad. Hamilton
extends up along Bear Creek
Valley

At Summit go N on 83 many
cuts.

79.7

1925

Section 0.3 mi. S. of
intersection of Pa 83 and
443. and 3.7 miles north
of Summit Sta.

About 50' ± of greenish and
bluish shale with *Echinocoelia*
and *Leiorhynchus* at base, and
claus, *Lytaena*, *A. spinosa*
above.

Lully is at N or lower
end of gy. *Vitulina* is in
ditch just below gy. on
W side of road.

Summit - Pine Grove Hamilton

S. side Swatara Creek 3/4 mi
SW of Suedberg. Coral bed
possibly Centfield

Due East of H in Philadelphia
in Swatara gap on road on
east side creek at bend.

Onondaga resting on Silurian and
overlain by ~~Dur~~ Marcellus.

Down from Suedberg along
Swatara Creek to the gap
is Montebello ss.

1926

September 8, 1938

Pennsylvania

88 - About $\frac{1}{4}$ mile south of Rupert on Pa St. Hwy 42 & fine cut of Portage for about $\frac{1}{4}$ mile or more. Williams & Kendall's Catawissa section on east side river opposite Rupert.

Bloomburg Sheet

88' - Section along Little Fishing creek on Hwy 42 just above confluence of Little Fishing Creek & Fishing Creek. Marcellus exposed and of Cardiff type and located at bend of road and for about 0.1 mile to north. Dark rock here proves not to be Marcellus but well up in Hamilton about 60' below top.

At about 0.10 mile from ^{road to W} bend above bend Tully appears. Shaly as at Lockhaven & S of Danville with *Ectinoscolia* at base and *A. spinosa* & *Lophosoma* in upper part. Tully $N 76^{\circ} E 70^{\circ} N$
Section Black sh. $N 76^{\circ} E 17^{\circ} N$
from blk sh to *Vitulina* 125'
From *Vitulina* to highest Tully 80'
From Tully to lowest exposed Braillier 240'
Braillier to Trimmers Rock ss. 140.
Reading Trimmers Rock $N 78^{\circ} E 46^{\circ} N$
Tully between 30-35' thick.

1927

Vitulina zone contains also Sp. tullius of small variety.

58² - Onondaga in river under bridge at Belwick

58³ - 4 1/2 miles S of Shickshinny on U.S. 11 - strongly cleaved upper Tully with gentle dip to North. Lophospira at top. On N limb of anticline. Hamilton 3/8 mile to South.

58⁴ - Tully 1/2 mile NW of Egers Grove on road over to Benette School. Genesee exposed just NW of house & Tully about 0.2 mile west of house and exposed for fully 0.1 mile on top of hill. Very low dip. Hamilton exposed just over Little Fishing Creek on west edge of Millville and along road over hill to Spruce Creek. Genesee down hill from about 0.1 mi. W of house to bottom of hill.

Hughesville
sheet

1928

Sept. 9, 1938

Cut in Moscow 2 miles
NW of Northumberland, Pa.

Cut begins on N side of gully
About 10' above base of bedrock
comes *Vitulina* and *Tropidoleptus*
in abundance in a sandy layer
N68E 51°S.

About 30' above 1st *Vitulina*
is a second zone. about 5' below
this second zone comes large
Cypicardella, *Chonetes* n. sp., *A.*
undulata and *Tropidoleptus*.

About 50' below top *Sp. belphege*
abundant. On upper 20' come
Elythia, *Atrypa*, *Vitulina*, *Abhyris*,
Sp. aculeptilis.

89' - About 1/4 miles N of
Mansdale on Pa 54. Humilton
with *Vitulina*.

892 - 1.55 mi. S of Washingtonville
on Pa 54 about 30' of *Marcellus*

Winfield 893 - on Pa 404 1/2 mile S of
Winfield excellent cut in *Marcellus*
with *Leptobryozoa*, ss lenses in
lower part of cut.



1929

594 - Section opposite Penn Rk bridge on West side river about 1 mile below Marysville. Excellent section in Montebello ss. Base of Montebello exposed about at bridge head.

87 paces from end of cut a shale 15-20' thick appears. This runs to 94 paces.

94-187 - At 187 a thick coquina of *Sp. tullius*? 2-3' thick.

187-248 - ss with some interbedded shale. N 78 E 83° S overturned.

At 248 a 2' bed with large cup corals = possibly Centerfield. 248-308 - to end of cut. Top contains big button-shaped crinoid stems.

308-406 - Covered

406 - About 50' fine greenish shale with *Vitulina* at S end and 3' Tully about 8-10' from S end. *Echinocochia* appears to be mixed with West Brook fossils. Upper end of section & contact with Genesee not determined. Tully just 100 paces north of top of Montebello ss.

Sept 11

Tully 100 paces N of Montebello ss. *Vitulina* at top of Hamilton. *Liorhynchus* found about 2" above *Vitulina*. Lower 6' of Tully abounds in fossils.

Lowest 3' of Tully contains
Echinocaelia with Leiodonchelus
at very base. Tully exposure continuing
29 paces above Vitulina.
Contact of Tully & Genesee (Berket)
sharp. Tully olive color & Berket
black. Upper Tully contains
Bambexia, Chorates & Apicandella
Tully probably 40-50' thick.



1930

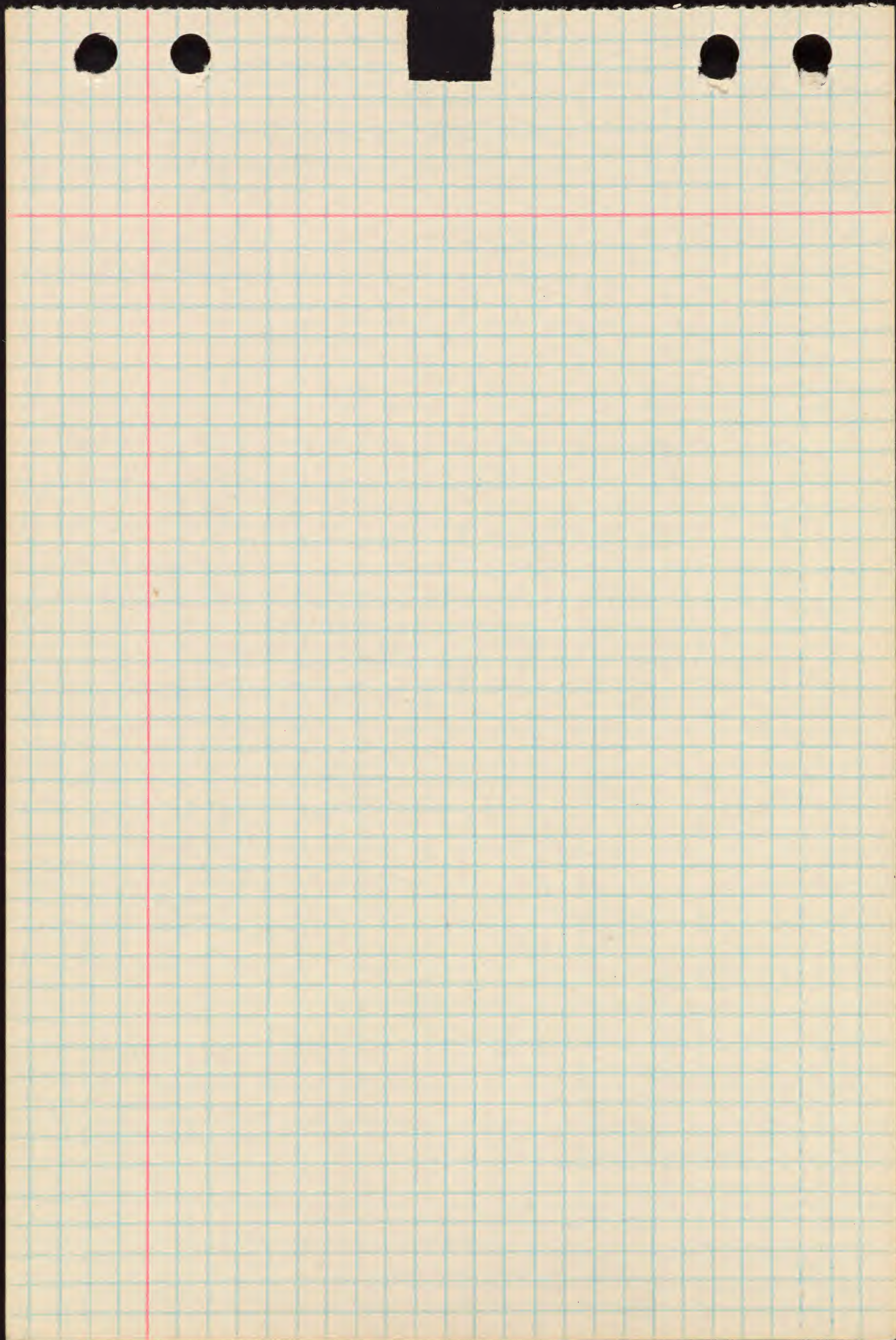
September 10, 1938

Section on ~~Phil +~~ Reading Rk
north of bridge over highway Pa
895 on east side of Auburn.

Base of Tully strikes E and W and
dips 35° North. Base a hard
ss. with *Leiorhynchus*. Above for
10-15' *Leiorhynchus* + sp. mucronatus
common.

25 paces above lower *Leiorhynchus*
bed is an 8" band crowded with
Echinocoelia. Above this comes
softer shales abounding in
Tropidoleptus. Total Tully exposure
is 60 paces. Base is exposed 535
paces from bridge.

16 paces below lowest Tully to
Vitulina



Nov. 6 1931

Compass bearings magnetic N.
Reach Union School from

Fishna. Take 76 road to school
Outcrop in creek. N 64 W 30° NE

0-26 light brownish gray ls with
large chonetes and a spiniferoid
like sp. lucasensis. 10' exposed.

20 feet exposed, dark, weathering
heavy bedded ls. Chonetes
abundant. Chert in middle

50-60' exposed

76-52 covered.

52-78 Light & dark weathering
limestone with small chonetes
and Microcyclus in lowest 10'.

Leptaena, small corals, Schizophoria
Tip 250 in lower part crop but
flat in upper part. Microcyclus
found in whole section.

78-105 covered

105-118 - light weathering cherty ls
with Schizophoria. N 70 W 32° NE

118-195 to road.

195-261 - side road to NE

261-457 - stream - road cross

457-583 granular limestone
brownish gray abounding in
corals. Uppermost 10' smooth
blue gray, brown weathering

583-683 - Union School.

The structure of the beds at
the top containing the corals
cannot be ascertained as the

1366
342
1708

1932

exposure seems to consist wholly of slumped blocks. These can be seen in the bank of the stream for perhaps 100 yds. Although these upper beds suggest the Lingle very strongly I failed to see Centronella or Vitulina.

Nov. 7.

In morning went north on Perryville road toward St. Marys. Just north of Perry County line road to Minnth turns off. Take this road to a point about 1 1/2 miles north of Cludgdependence School. By side of road are crumbly green and red Bainbridge shales with Pisocrinus and Blastoids which may be picked up. In the woods above this locality Bainbridge limestone contains pockets of fine fossils. We collected some lumps here.

In afternoon went to "Troublesome Hill" for Bailey fossils. These occur next a fault bringing up the Bearoais against the limestone.

Remainder of afternoon was spent collecting Little Saline ls. at the quarry.

1933

From the wedge of Beauvais faulted against the Bailey on slope of hill and on top of hill we found blocks of chert containing a Chonetes strongly resembling those found under the Microcyclus beds of the St. Laurent at Union School

November 8

Send Bell a Silurian blastoid for the one taken from him at the Pisocrinus locality.

In morning collected Platten along southwest face of hill about $1\frac{1}{4}$ miles SSE of River and Vases. At base of hill Joachim is exposed as yellowish weathering earthy ls. Platten is dove-colored, fine-grained suggest Lowville or Woshkem in its lithology. a rhynchonellid and a species of Rhynchocamara occur here.

After lunch Cooper collected Beauvais about $\frac{1}{4}$ mile north of four corners south of Beaman School. On lowest exposure about $\frac{1}{8}$ mile from intersection Newberria occurs. Above the Newberria at last exposures seen several clams were collected. Nowhere was a typical Hamilton fauna seen.

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Third block of handwritten text in the middle section, illegible.

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1934

The upper part of the Beauvais exposure east of four corners below the Boardman School becomes calcareous.

Excellent Platten exposures are to be found about $1\frac{1}{2}$ mile NW of the Chicago Summer camp buildings on both sides of a small creek and along the old road. Silicified brachiopods are common.

November 9

Spent morning packing fossils. Shipped 756 pounds from McBride.

Afternoon headed for St. Louis. South of Barnhart on US 61, 67 and just south of Koch School under church (Stop 51, K. D. Sec. Field Conference 13) is exposure of Decorah. We collected the 10' of rock above a green shale and below the Kimmewick. *Pionodonta* and *Rafinesquina* were particularly abundant. *Sowerbyella* occurred in lower part of cut.

Just north of school take road east to Glen Park. Road forks and a great quarry can be seen east of fork. Take left fork to Glen Park Station.

1935

Walk down R.R. to lime plant
On RR cut is Kennesaw
overlain by Curdsville.

Type section of Glen park ls
is on nose of hill west of RR
cut and opposite lime plant
RR cut at Grize excellent
for Decorah.

November 10.

Left Valley Park in morning
in downpour and went on
to Louisiana, Mo. By time we
reached L. the weather had
cleared and came cold.
Called on Mr. F.R. Long. Sent
Mr. L. Savages paper on the
Alexandrian of Illinois.
Left Mr. L. and headed for
Quincy. Collected Decorah
by roadside (U.S. 61) just
south of Salt River not far
north of New London, Missouri.
After collecting went on to
Quincy for supper and to
Clayton, Illinois for the night.

1936

Vacation July 1-22, 1940

July 1.
New York City to Danville, N.Y.

July 2

Danville, N.Y. to London, Ontario.
Collected at East Bethany; visited
Letchworth Park.

July 3.

Collected with Southworths at Tile Yard,
Commander Finlays and from pit
on Port Frankes Road.

July 4.

Collected at No 4 Hill all day.

July 5.

Thedford, Ontario to Alpena, Michigan

July 6.

Morning in pit on west side Alpena
Cemetery. afternoon spent in Potter
Farm fields and at south end of
Long Lake.

July 7.

Visited abandoned shale pit Alpena
Portland Cement Co. Collected all day.

July 8.

Visited Rockport Quarry. Crinoids almost
exhausted.

July 9.

4-Mile Dam, Norway Point Dam.

July 10.

Partridge Point and Genshaw on
French road.

1937

July 11.

Rain - went out on new U.S. 23. For a distance of 5.75 miles SE of intersection of U.S. 23 and road to Posey, outcrops of Rockport ls may be seen. Fine fresh cuts. 2.4 miles SE of same intersection about 8' of Bell shale can be seen overlain by Rockport limestone. Excellent view of contact.

July 12

For 20 miles along U.S. 23 exposures from Bell to Genshaw may be seen. They begin just east of the D. & M. R.R. crossing SE of Rogers City. 0.2 mile east of crossing a large bluff shows Ferrow Point shale below with Genshaw above.

July 13.

2 miles east of Bolton road small patch of Genshaw occurs. East of here exposures become common and include uppermost Genshaw with many corals and lowermost Killbuck with large Pentamerella, Atrypa + Cyrtina. Specimens are very abundant and occur also in the gravel.

Traverse U.S. 23

Railroad & U.S. 23 intersection	—	399.8
Jy 12 Ferron Pt - Yushawa (coll.)	—	400.0
Jy 12' Ferron Pt ? (coll.)		401.65
Jy 12 ² probable Rockport	—	402.1
Jy 12 ³ Rockport	—	404.0
Jy 12 ⁴ Rockport (coll.)	—	404.3
Rd. to Presque Isle Harbor	—	407.5
Rd. to Posen	—	410.
Jy. 12 ⁵ Ball contact (coll.)	—	412.3
Jy. 12 ⁶ Rockport	—	412.5
Jy. 12 ⁷ Rockport	—	412.7
Jy. 12 ⁸ Rockport	—	413.0
Jy 12 ⁹ Rockport	—	414.1
Jy. 12 ¹⁰ Rockport	—	414.5
Jy. 12 ¹¹ Rockport	—	414.6
Jy. 12 ¹² Rockport	—	414.8
Jy 12 ¹³ Rockport	—	415.2
county line Presque Isle - Alpena	—	417.5
Yushawa		420.4

1938

Lakewood

420.85

July 14 - Collected Rockport at
Rockport Ar. Collected Potter Farm
1/4 mi. S. of 4-mile Dam for Ellen
Collected on west side Long Lake
mainly Lower Killians

Inverse of U.S. 23 from D+M RR
Crossing to Lakewood.

0.2	East of RR —	Fanon Pt. 7.5 mi. S.
1.85	" " "	Fanon Pt.
2.3	" " "	probable Rockport
4.5	Rockport with	Chronicles
12.5	Bell contact	

D
Illinois 1942

Aug. 1. Left Washington 9:00 A.M. and arrived in Wheeling, W. Va. 6:00 P.M.

Aug. 2. Left Wheeling 8 P.M., arrived Penn, chd 7 P.M. Decided to take northern route for short stop at Pipe Creek Falls.

Aug. 3. Spent morning at Pipe Creek Falls. Collecting very poor. River exceptionally high. In afternoon went to France Stone quarry, 3 mi east of Logansport to see Devonian. Collected corals. At Delphi, Ind. examined a shale pit in Delphi shale. Arrived Danville, Ill. at 8 P.M.

Aug. 4. Danville to Urbana. Urbana to Elizabethtown to call on J. M. Weller. Spent night at Elizabethtown.

Aug 5. Altoona creek, SESESW 1-135-2W
3/4 mile SS W of St Pauls Church
Total exposure of 7 or 8' of dark shaly limestone, the chert most abundant at top of outcrop under green Springville shale. Top is fine grained gray, dotted with few fossils. Lower beds are dark fine grained limestone with in beds about 2" thick separated by sandy partings containing bivalve markings and small chert nodules.

Aug 5'. Bluff of about 40' of leached shales, now brown, green and red. Dip downstream. Fossils rare. Rock is undoubtedly leached argillaceous ls. Upstream about 20 yards comes another outcrop dipping upstream. Lower 4 feet is light shaly material, red and green in color. On top of shaly material are 2 feet

(2)

1947

of glauconitic ss. Weller says this may
be top of green shale (Springville)
This in middle center east half
NE $\frac{1}{4}$ sect 2 - 135-2W.

Aug 5² N branch Cope Creek SW NW $\frac{1}{4}$ 35-135-2W,
3 mi W of Mill Creek.

Section showing Musienheimer with
Leiorhynchus probably resting on Dutch
Creek which seems to be in place.
Musienheimer contains thin sandy-limy
beds with a few corals, Chonetes and
Ambocoelia. Tringle not in place but
large blocks of it slipped off hillside

Aug 5³ ~~N branch Co~~

Center NE $\frac{1}{4}$ 15-125-2W. ?

New road cut showing 15' \pm of
Dutch Creek resting on Clear Creek Chert.
Soil above Dutch Creek yields silicified
Microcyclus and other corals.

Aug 6. About 10' Grand Tower Is. on road
to Alto Pass about 3 miles W & a little
south of Cobden. Coarsely granular
light gray and brown flinty
massive beds. Contain *Sp. macrum*
and *Amptlingenia*. According to Weller
this near the top of the ~~Atkinson~~
Grand Tower.

Aug 6² Grand Tower just W. cent of section 1
just below word Union W of Alto Pass.

(3)

1848

Aug. 6² ~~SW~~ ^{NENE} 2-115-3W just S of county line.

Aug. 6³ Backbone ls. = Little Saline center section 23-115-3W, tributary Hutchins Creek.

Aug. 6⁴ NE SW 9-125-2W, 4 mi. NW. of Jonestown

August 7 now dll. 127
Road to Alto Pass / Dutch Creek is
approx. 1 mile north of intersection with
dll. Hy. 146. Clear creek underlies it and is
exposed just S of turn off to the State Forest.

Clear Creek: - Light gray fine granular
hard limestone with surface but / conchoidal
fracture. Contains irregular beds of yellow
chert often iron stained and red brown
where considerably weathered. Some of the chert
where freshest is gray-white. Fossils occur
throughout. *Amphigenia* is common. At this
place the Clear Creek is nearly horizontal.
Top of Clear Creek abundant in *Calymene*, sp.
Leptocyclus, *Amphigenia*, *Leptocyclus* sp. *diversus*
is also present.

Dutch Creek: - just E of center NW 1/4 NE 1/4 15-
125-2W on west side new road to Alto Pass
one mile N of junction with dll. 146.
Dutch Creek is 12 feet thick, dips east about
6°. Contact with Clear Creek sharp. When fresh
is white, sugary, friable sandstone stained
red in most parts. Bedding surface shows
reddish limonite deposits on the lowest
beds somewhat thin-bedded as are uppermost
2'. Middle beds massive. Fossils very
abundant particularly *Planolites* and *P. m. m.*

④

1949

a conical Favosites, cup corals, Amphigenia, Dalmanites Outcrop 175' long

"St. Laurent" - Above the Dutch Creek in the red residual soil were found Microcyclus and an abundance of small cup corals. We think this indicates the close proximity of the Microcyclus bed to the Dutch Creek. Along with the corals are plates of yellow weathered shale suggesting the Misenheimer. The corals are almost completely confined to the south side of outcrop. A few on N side suggests that "St. Laurent" went over top of Dutch Creek. Grand Tower is exposed about 1/2 mile north on a branch of Dutch Creek and this may be southernmost exposure of Grand Tower.

Aug 7¹ SWSE NW 1/4 34-115-2W in stream on east side Alto Pass road 2.7 miles north of Dutch Creek outcrop is Dutch Creek with patches of sandy Grand Tower on it. 0.35 miles farther north is Grand Tower beside road in a fine cut. These two sections are essentially on the strike and indicate 20-25' as the thickness of the Grand Tower.

Aug 7² Grand Tower road cut NW 1/4 NE 1/4 34-115-2W - Heavy bedded light gray and gray brown limestone in beds 3' or more thick. About 13' exposed. This taken with position of Dutch Creek .35 miles south suggests a thickness of about 25' for Grand Tower. Microcyclus was found in float above outcrop and in crevices.

$$\begin{array}{r}
 225 \\
 2 \\
 \hline
 450 \\
 113 \\
 \hline
 563
 \end{array}$$

$$\begin{array}{r}
 1045 \\
 583 \\
 \hline
 3135 \\
 6270 \\
 \hline
 5225 \\
 \hline
 588335
 \end{array}$$

$$\begin{array}{r}
 1908 \\
 583 \\
 \hline
 5724 \\
 11448 \\
 \hline
 9540 \\
 \hline
 1074204 \\
 58 \\
 \hline
 165 = 52
 \end{array}$$

1045

137
- 17
120

(5)

1950

Aug 7³ On Green Creek center N line 23-125-24.
Good exposure in bluff where stream
cuts against it. About 15' granular limestone
marble-like in texture and with
Pholidostrophia & *Sp. lucasensis*. On top
of this is *Microcyclus* bed. Above in
woods are loose blocks with small
Chonetes, *Sp. murronatus* and *Tropidoleptus*.
Along highway 0.1 mile east of bridge over
Green Creek occur blocks of very hard
limestone with *Tropidoleptus* rare. 30-40'
up on hill slope shaly beds contain small
Chonetes and big *Strophodonts* suggesting
beds above *Microcyclus*. Nothing is in place

Aug 8. Darty Creek

A81 - About 3' of Dutch Creek in bed
of Darty Creek. This 100 paces down from
sharp elbow of stream. It is 200 paces
from Dutch Creek to east elbow where
stream becomes more parallel to old
road. 225 paces above the Dutch Creek
comes the lowest Lingule, a jumbled
mass of shaly, cherty limestone blocks.

The lowest Lingule exposed, which is
nearly in place consists of shaly dark
limestone with harder limestone bands
and chert layers. The highest block of
this layer is about 15' above the level
of the stream. Rock appears for 60'
up the slope. About 45 feet up appeared
blocks of light gray granular limestone
with abundant *Vitulina* and occasional
Tropidoleptus. Above these blocks
appear shaly limestone pieces and
what appear to be cherty gray limestone
in place. This limestone has the

⑥

1981

Dip $580^{\circ}E \pm 11^{\circ}2$

appearance of the *Microstylis* bed but we could not prove it.

The lowest block exposed contained abundance of *Cratopora*. The usual small *Chonetids* are also present.

At 305 paces above Dutch Creek are tumbled blocks of coralline Hamilton limestone which are not in place. On the stream bank are 5 or 6 feet of yellow gray shale. Above the shale and for about 20' come shaly limestone the upper beds with chert nodules. These upper beds contain *Sp. pennatus* + *Cratopora* and are tied to the tumbled blocks at 225 paces.

At 425 paces is outcrop of shale just $550^{\circ}E$ of first house up Party Creek. Here about 20 feet of rock exposed. Lowest bed is about 2' of hard slightly calcareous sandstone. Then about 10' of thin bedded sandy gray shale, then 3' of thin bedded shaly sandstone followed by about 5' of thin-bedded sandy shale. 10' feet of shale bed carries a *Lingula* in some abundance. The upper bed ~~is~~ of about inches 6-9' is thin and contains *Leorhynchus* in abundance. The thin material extends through about 3' and contains chert also. The lithology is suggestive of the Alto band. Dip 16° .

At 625 paces above Dutch Creek comes outcrop of Alto, about 11' of hard cherty sandstone probably somewhat calcareous. The dip here is about 6° . This outcrop is where stream goes NE against the steep bluff. At 725 paces Mountain Glen shale appears in a bluff and some 20-30' occur. The Mountain Glen is in place above the Alto.

1952

A power line cuts over Alto - Springville and is exactly on section line. Pacing from section line on road is 670 paces to gully with Grand Tower and ~~then~~ at 700 paces is about opposite Dutch Creek locality.

Dutch Ck - to first Lingle 80'
Lingle - Alto 57' 184
Alto - base of Mtn. Glen 47
Based on a uniform dip of 6° E.

This Saturday at 2 PM we were forced to quit because of rain. This is the 5th day on which it has rained since we left home. So far we have not settled our major problem: the Hamilton sequence. It looks as though much of the Grand Tower would prove to be Hamilton. We have not yet determined the position of the Utahian bed but its presence on Dutch Creek shows that it goes north of State Highway 146.

Aug 9.

Lingle Creek - Bluff in SW 1/4 26-135-261: -

About 0.1 mile downstream from crossing of Lingle Creek and highway Dutch Creek appears in banks of stream. It is underlain by blue sandy shale much fractured and cemented by limonite.

On a small branch of Lingle creek about 175 paces downstream from road and creek crossing and 100 yards up the branch Dutch Creek is present. It is nearly flat where the branch crosses a wagon road but some 20 yards from the wagon road it plunges steeply to the northeast. On top of this sandstone is a mass of shale with steep dips but showing two flexures. Near the top occurs a rotten mass with a layer of chert above. The mass continues

River gravel
60" ^{out} _{Tropisapha} ^{patch} _{area}

③

1883

Cyrtina and Trigidoleptus. Bothy thinks these beds in place. If so our faunas are much out of place because the Trigidoleptus affinis appears at the top of the section. Chert appears in the lower part of the shale bed at least in 5 levels. It seems to me to be scattered although a band occurs above the lowest limestone block. All of the exotic material is confined to the lower 13 paces of the exposures on the ~~side~~ road 30' above the ss. The dips and strikes of the shale do not conform to that of the ss. Furthermore considerable shale appears below the sandstone near the branch and road crossing. The boulders ~~and~~ are immersed with secondary limonite and some of the ls. altered to limonite.

T. alto

- | | | |
|------------|-------|--|
| D. covered | 8'± | Gray very fine grained ls. with crinoid stems |
| H. | 1½-2' | shale? |
| G | 3-3½' | |
| F | 3'- | Shaly weathering hard ls. with scattered chert |
| E | 6' | Shale? |
| D | 4½' | Hard sandy ls. in lower 3' but oolitic ^{upper} below part with large corals, Cretionella, |
| C | 11'± | Yellow sandy shale as chips in bank. |
| B | 18" | Rotten limy sandstone |
| A | 18' | Murchison |

(9)

1954

D. - The oolitic part comes about one foot below the top of D. Bed D. apparently thickens and thins somewhat also becomes hard and sandy where fresh.

May = oolite bed at Darty Creek.

F. Hard limestone bed about $2\frac{1}{2}'$ showing but part buried making probably $3'$ or more. Scattered chert in small irregular lenses and nodules. Fossils: Crinoid stems, Elythra, Schuchertella, Gray very fine grained ls.

H. About $1\frac{1}{2}'$ - $2'$ gray fine grained limestone with thick chert nodules, large crinoid stems.

I. Covered - no rock seen in $8'$ above last exposure.

J. At top of $8'$ comes scattered sandstone and chert of alt. type.

The segment of the creek that swings east over the highway flows south close to highway and then swings to west. This portion of creek has excellent exposures of shale and some loose blocks of the oolitic and sandy Tringle with corals and *Centronella*, *Utricularia*, *Tropidoleptus*.

Aug 8'

Branch of Cooper Creek SW $\frac{1}{4}$ NW $\frac{1}{4}$ 35-135-24W. One loose block here contained *Antrocochia*. This is like blocks above *Centronella* bed. *Antrocochia* was seen above *Centronella* bed in the exposure to the north.

On the shale on this creek several exotic blocks were seen, and where the Dutch Creek appears the rock suggests a fault breccia

44/5
51

26/5
18

1955

10

as it contains fragments of the Springville
light green shale, Mtn. blue shale and
other exotic pieces. The Dutch Creek
appears about 100 yds. upstream from bridge
at intersection.

In the Missoulian here occurs a
bed of leached lime ss. containing a few
small corals, small Chonetes, Ambocoelia
and Sp. muricata. This is clearly a bed
in place and suggests our Michigan
bed.

August 10.

Position of
Microphylla



Section at Bakerover ridge. Section
begins on ridge where it butts into
water at west side. Strike about 20' above
base $N 51^{\circ} W 24^{\circ} E$. Highwater is 100 ft
above standard. Magnetic = $N 46^{\circ} W$ true N.

A- is a considerable thickness lumped
together. The bed contains a fairly thick
chase ss at the top which varies from
3-5'. The top of the ss is irregular
and contains some carbon to form
a dark surface. The lower part 10' +
has some sand but is mostly granular
moderately crinoidal limestone when
weathered but hard and marble-like
when fresh. It strongly resembles the
bed at Mountain Glen. W of Spring the fine
the ss. ~~It is about the middle of~~
~~the formation and is about 7' thick. It is~~
~~thin.~~ I saw few identifiable
fossils but the presence of the large
macrothyris type of Spinger like those
in the Grand Tower at Mountain
Glen is good evidence of that
formation I think. Large Leptæna
and Rhynchonella were also seen
but the characteristic corals of the
Dutch Creek were not detected.

①

2880

B. Irregular lens-like layers of limestone separated by thin partings of coarse sandstone. This is the upper limit of the coarse sandstone and is at the Nangle of the Bakeover near water-level.

✓ C - 35' of light yellow to brownish gray moderately coarsely crystalline limestone no fossils seen

D - Covered interval of 6'

E - 10' dark brownish gray limestone in 6"-9" beds. Fossils few. *Proetus*.

F - 2' covered.

G - 6' dark brownish gray limestone with *Camarotoechia*. A distinct lithological change occurs at C-E. *Atrypa*.

H - 33' of same type of rock but with few fossils.

I - Is fossiliferous part of section. 12' above bottom of I occurs a zone with abundant *Rhipidomella*.

25' above base of I. comes a one-2' foot bed crowded with *Chonetes* of medium size and containing also a large *Paraspirifer*. This bed is quite shaly and has a very rough surface showing the sections of *chonetes*. The upper 15' has abundance of *Pholidostrophia* and the topmost 2 feet of the section abounds in yellow chert.

~~Fossils from E-H.~~

12
15

52

(12)

1857

Microcyclus was not seen in the section at the Bakeoven but south about 150 yards at a gap in the north end of the Backbone sequence. Microcyclus occurs with other corals and Schizophoria at the edge of the quarried part of the backbone. It is likely therefore that Microcyclus occurs in the Schizophoria bed of my section of 1936. In the south quarry face at this point the Chonetes zone 25' above base of I occurs and is very conspicuous. Microcyclus occurs with Schizophoria, and Leptæna 27' above the Chonetes bed. The Microcyclus bed with its Schizophoria may = my Schizophoria-Leptæna beds of the 1936 section. The Microcyclus bed is at least 5' thick and forms the highest beds of the dip slope on the north end of the backbone. The place where this all can be seen is south of the fine house at the Bake oven. So through the gate at the garage, past the barn to the gap between the high and low parts of the ridge 257 paces in all 643' in all.

At the Bake oven the Chonetes zone is located about 5' below the easternmost long dip slope near the middle of the exposed rock.

The zone of abundant yellow chert appearing at the top of the exposed section this year occurs about 10' below the Microcyclus zone in the quarry face.

514
119
603

(13)

1958

1953

Fossils from E through H to the base of the Chonetes bed are hard to get. I saw low down *Atrypa*, *Microspira*?, *Camerozoechia*. Higher came *Lep Taena*, *Rhipidomella*, *Schizophoria*. Small *Chonetes* occur everywhere. Large cephalopods rare.

With the *Chonetes* zone comes large *Paracyclas*, a large *Chonetes*, *Pholidostrophia*? and these continue into the *Microcyclus* zone.

In picture 3 *Chonetes* zone is just under big block under small tree at base of massive ledge.

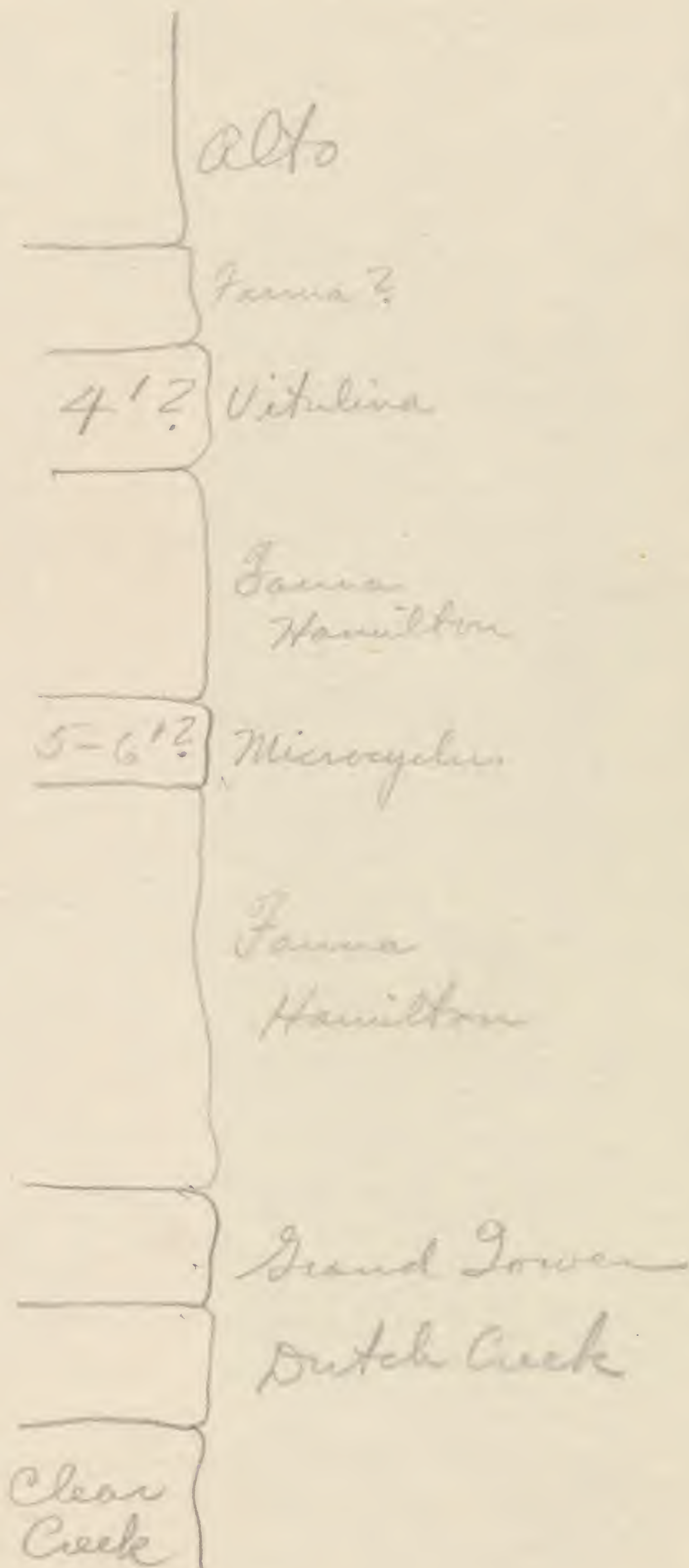
Aug 10'

Dugway 0.2 mi. S of RR station in Grand Tower east of road. 15' hard granular brownish gray ls. with few fossils. *Crinoid* stems, *Camerozoechia*, *Atrypa*, *Spina*. I think this belongs at base of Hamilton just above Grand Tower thin band of chert 5' below top. on SW face of Walker Hill.

After reading Savage's section it is possible to match this with ours very well. Beds 556s and 556t and our *Chonetes* zone.

Beds 556a + 556b = sandy Grand Tower or Dutch Creek. Beds 556c - 556h = my bed C. 556i - 56a = E to *Chonetes* zone of I. 556u - y = beds to nearly the *Microcyclus* zone. Savage takes his change to the Hamilton where more shaly beds appear. The *Microcyclus* zone is not always more shaly but, as on Ntn. Glen, is a hard/dense argillaceous limestone.

Hypothetical section



54
3
191

(14)

1959
1883

As we see the single now: the beds above the crystalline light marble-like limestone of the Grand Tower are Hamilton. These show a striking change at the Bake Oven. The lower 51 feet of that section are crystalline and light colored but the beds above are less massive when weathered and of varying degrees of brownish gray. They usually are bituminous and small somewhat oily when fractured. Possibly the

Aug. 11

Darty Creek reexamined

8 1/2'

alto float

1 1 1/2'

5 1/2'

1 1/2'

7 1/2'

2 1/2' x line ls.

Covered

14'

3' cherty ls.

22'

Covered

56'

G 22' above stream level at tumbled blocks. appears a ledge in bank probably representing position of tumbled blocks.

E² About 40' above stream level appears a 2' ledge of x line limestone (D) containing Vitulina and Tridoleptus.

E E is covered but E² is a foot and 1/2 of hard bluish limestone possibly in place but possibly float from F. It contains Sp. mucronatus.

E² is covered but F is 1-1/2' of hard limestone like E' with small corals and a few other Hamilton fossils. Above G. the float is of Alto type.

C D- is 2' 9" with the oolite forming the lower nine inches

~~2' oolite~~

38

34
25
19

~~Tridoleptus~~

base of alto 137' above Dutch Creek. Vitulina 16' below Alto. in these 121' above Dutch Creek. + Tridoleptus. Microgonium is 20' above Dutch Creek

(15)

1860

The Vitulina are most abundant in the lower 2'. I did not see them in the oolite. The loose pieces showing oolite ~~showing the oolite~~ have this bed on the top, but where the rock is in place no oolite shows suggesting the possibility that it is under the big blocks. It is not however as much eroded as the Vitulina bed which indicates it should be at the top.

Scotty excavated and showed oolite under the blocks with Vitulina. The section of D is thus

fine granular Vitulina	} 2'
coarse granular ls without Vit. 6" ±	
oolite 9"	

The oolite bed is thus the reverse of the situation at Fingle Creek where the oolite comes just above Vitulina, Centronella and Dropidoleptus. We may thus be dealing with two Vitulina beds separated by oolites.

Grand Tower locality revisited
A definite lithologic distinction can be detected between the upper beds and the lower ones with Amphigenia and big Spinfers. The latter are more massive and weather on their sides to a different pattern. The lower beds are light colored, bluish gray and weather with a strong flutting. The upper beds are weathered with more closely spaced flutting and have a more shaly fracture when weathered. The upper beds are brownish gray and formally different from the lower ones. As there is a 6-8° dip

$$\begin{array}{r} 8.5 \\ 25 \overline{) 216} \\ \underline{200} \\ 16 \\ 15 \\ \hline \end{array}$$

$$2.5 \overline{) 8.5} (3.4$$

$$\begin{array}{r} 586 \\ 478 \\ \hline 108 \\ 2 \\ \hline 216 \\ 58 \\ \hline \end{array}$$

$$\begin{array}{r} 270' \\ \cdot 225 \\ \hline 1350 \\ 540 \\ 540 \\ \hline 60750 \end{array}$$

$$\begin{array}{l} \tan B = \frac{30}{20} \\ 20 \times C = 130 \\ C = 130' \end{array}$$



$$\begin{array}{l} \cos A = \frac{20}{38} \\ \tan A = \frac{30}{20} \\ a = \tan A \times c \\ 130' \end{array}$$

$$\begin{array}{l} \tan 15^\circ = \frac{30}{c} \\ \tan 130^\circ = 30 \\ c = \frac{30}{\tan 13} \end{array}$$

$$.2309 \overline{) 30.000} \\ \underline{6918} \\ 6082 \\ \underline{6918} \\ 164 \\ \hline$$

76

1861

The Amphigenia beds dip under the road at about the middle of the exposure. There are about 8' of them at the SW end of the cut. In the middle of the cut there are about 12' of brown ls. The brown ls fauna is different from the lower one and contains Pentamerella, Atrypa, Meistelloid, etc. A thin zone abounding in a small Centronella occurs about a foot - 1 1/2' below the top of the Amphigenia zone.

Hamilton

Omori.

Mountain Glen.

Mtn Glen

82' Alto

1 1/2' Hamilton

15' covered

5' Tarp. vit. oolite

5' covered

10' Calcareous shale

10' hard shaly ls. closely bedded

30' covered

5' shaly ls

10' covered

5' Microrhynchia covered

10' granular Cystina

Alto beautifully exposed in Clear Creek, dipping 13°. Top contains Tentaculites and Chonetes. Basal Alto is a cherty limy bed resting directly on hard Hamilton, a bed 1 1/2' thick containing Trochidoleptus. The Hamilton top appears in the hillside about 30' above the stream 225' west of the top of the Alto.

At 315 feet above Alto appears a thick ledge of Hamilton probably in place and about 4' thick. The lowest foot or more is oolite, the upper 3' contain Trochidoleptus, and Vitulina in a light gray argillaceous limestone about 1/2' above the oolite. In the interval above the Vitulina bed occurs yellow shaly ls. and cherty shaly limestone with Sp. numeratus and Strophodontia.

at 452 paces is a small gully showing 10' - 15' of bithe calcareous shale, weathering yellow

74
2
148
37
185

(17)

1962

At 478 a small Glen shows 15' of hard phaly sandstone dipping steeply. The lower bedded and *Striatopora*.

At 548 The base of the shales is are about 50' up on the slope and under them comes shales about 5' thick.

At 586 come 5' hard limestone with *Microcyclus* and many small corals in place at bend of stream where latter undercuts bluff.

At 600 comes a 10' ledge of granular limestone containing abundance of *Cyrtina* in its upper part. This is same as bed under *Microcyclus* at Green Creek. Bridge (old) comes at 610 paces.

50 paces from old highway bridge to new one. At 233 paces above old bridge at bend in stream occurs *Atrypa* zone of lower Hamilton which is exposed on the highway about 0.1 mile west of new bridge. 10 paces upstream and below the *Atrypa* bed comes Onondaga with large *Spinifers*.

Pictures -

- 1 - Dutch Creek on New Alto Pass road.
- 2 - Backbone from N.
- 3 - Quarry in Backbone
- 4, 5, 6 - Grand Tower on new Alto Pass road
- 7 - *Microcyclus* zone south of Ridge School.

94

5007.5
4.5/1045

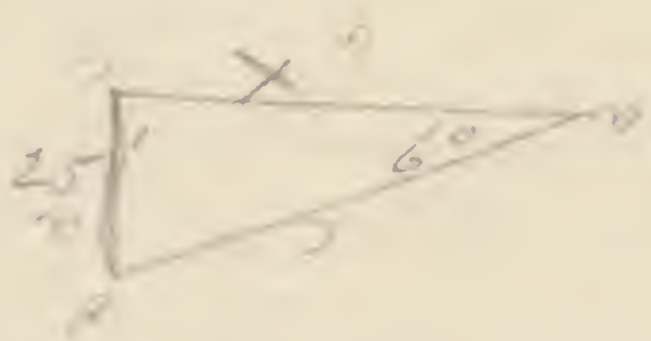


5007.5
4.5/1045
2.5 (5007.5)

$$5007.5 = 4.5 + 0.1$$

$$5007.5 = \frac{k}{2.5} \cdot 1045$$

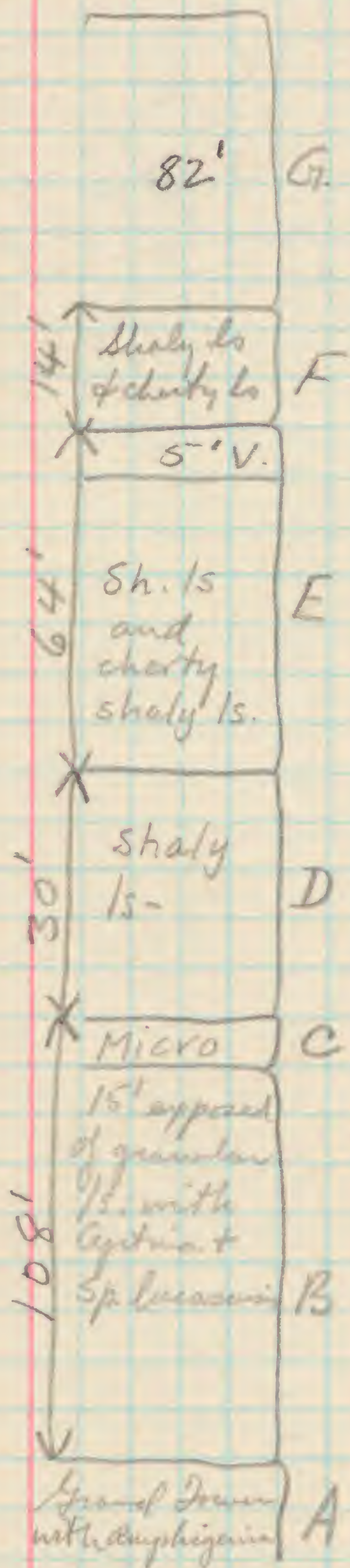
$$5007.5 = \frac{k}{2.5} \cdot 1045$$



(18)

863

Results of traverse of Clear
Creek by A.S. Warthin



A- Grand Tower

B- Hamilton to top of Microcyclus

C. Microcyclus zone

D- Microcyclus zone to top of shaly ls.

E- top of shaly zone to top of Vitulina

F- Vitulina to base of Alto-cherty ls + shaly limestone

G. Alto = 82'

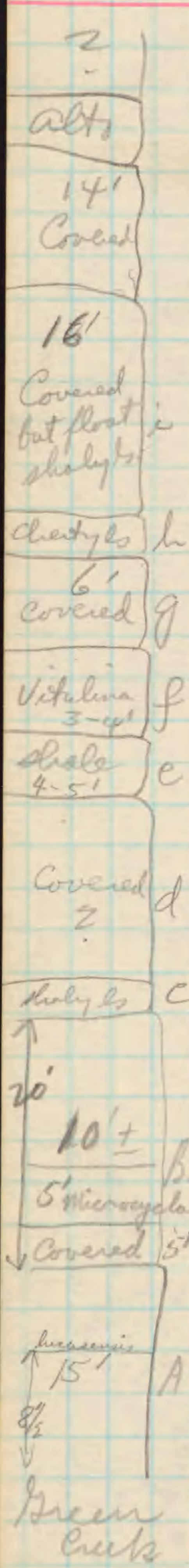
The section on page 16 should be adjusted to the thicknesses given here

108
21
87

(19)

1964

August 12 1964



Went to isolated area north of Hy. 146 and forming edge of bluff. Walked three spurs and saw Clear Creek and Dutch Creek float. About 0.1 mile north of house much Dutch Creek and Clear Creek float in a deep ravine. About 0.1 mile south of this ravine basal Hamilton was seen in the woods. Behind the house in a ravine Hamilton chert was present. We abandoned this place because of the poor character of the outcrops.

Green Creek reexamined
At bend of Creek about 15' of hard limestone with a band of *Cyrtina* beaks about 6' above bed of Creek. 2 1/2 feet above the *Cyrtina* comes a thin streak with *Sp. lucasensis*.

B - Covered with 2' ± at top of shaly ls. with *Tropidoleptus*, *Sp. mucronatus* and small *Chonetes*.

D. covered mostly. On slope east of exposures in creek loose blocks of *Vitulina* limestone can be seen. These are nearly in place above a few feet of yellowish shale in a small gully first south of the road and 250' east of the bridge over Green Creek in a recent cut just S of Hy 146. Above the *Vitulina* which showed the oolite at the base, came covered 6', the 2' of cherty ls. with thick beds of chert. Next the rock is mostly covered but plates of shale nodular limestone with the nodules

1965

1965

(20)

hand and finger contained Hamilton fossils: *Schuchertella*, *Rhipidomella*, *Elythra*. These fossils were collected for 18' above the Vitulina. 14' above the last fossils is a heavy ledge of *Alto*. This section thus proves to be similar to that at Ducky, Mtn. Glen + Triple Creek.

Late afternoon packed two boxes and made ready to move over to Missouri.

Aug. 13.

76-Creek

Section started at a thick ledge of limestone about 15' above creek level. This ledge is about 10' thick and consists of light brownish gray, hard limestone breaking into thick lumps. Fossils not seen.

1. 25^{paces} farther downstream is a ledge of the same limestone $N 33^{\circ} W 56^{\circ} NE$
3. 81 paces same type of limestone without fossils. Dip ~~50~~ 49° and strike $N 32^{\circ} W$. About 8' of rock exposed.
4. 136 paces - jumbled mass of rock somewhat crystalline and having the appearance of being deformed. Dip low compared to 12 exposures upstream, $25^{\circ} NE$, strike $N 35^{\circ} W$. Large *Paracyclas* and possibly *A. spinosa*.
6. 172 paces - 189 paces low outcrops in stream of granular limestone to fine grained light brownish gray with coarse ribbed *Productella* like those at base of Hamilton on Green Creek in Illinois. Other fossils *Pholidostrophia*, *Strophodonta*. $N 52^{\circ} W 6^{\circ}$.

Numbers refer to within stations but outcrops are consecutive

700'

952'

127
2
254
63
317

300'

(2)

1800

8 - 149 paces. Light brown fine grained limestone with *Chonetes*, *Lp. lucasensis*, *Pholidostrophia*. N44°W 28°NE. 6 is probably top of slumped block. Fossils taken from about 8' of rock.

161 paces a similar exposure about 5' thick

9 - 180 large exposure of fully 20-25' of rock making nearly continuous exposure with 8. Lower two feet contains *Lp. lucasensis* and a *Chonetes* in abundance. Contains considerable dirt

10 - 216 paces about 10' of rock abounding in *Chonetes* and *Laptania* N58°W

11 - 228 paces - Continuous with 10 is *Microcyclus* zone exposing about 10' of rock containing *Microcyclus*, small corals, *Schizophoria* common. N48°W

12 - 266 paces. About 8' brownish gray limestone with small *Chonetes*, small *Spizifer*, small *Atrypa* and a large smooth brachiopod.

To 631 paces covered. Then comes granular coral limestone. Beds go up 10' in bank?

At 746 come hard blue limestone at 826 came the school.

1058 paces up the road along the creek is a small ravine on the NE side showing 20' + of rock above 15' covered, 35' if all. Near base of section *Atrypa spinosa* occurs and probably corresponds to *A. spinosa* at 4.

453

1800

532

876

228

11

195

876

631

195

195

195

195

195

195

195

195

195

195

195

195

over

Microcyclus bed occurs opposite
a point on the road 250 paces
southeast of the house

(22)

1967

August 14

Composite section in two small gullies just SW of main creek at a point about 350 paces south of school. Waitin station 31.

10-12' D

7' C

16 B

22' A

A - 22' of heavy bedded fractured ls. with few fossils but with upper 4" thinly laminated and containing a peculiar *Penicillaria*-like brachiopod. This is the same shell as at sta. 12 of Aug. 13.

B - 16' covered

C - 7' fine grained light gray limestone laminated below but with one crinoidal streak near the middle

D - 10' - 12' crinoidal limestone with many corals as at school

E covered 15' - 20'

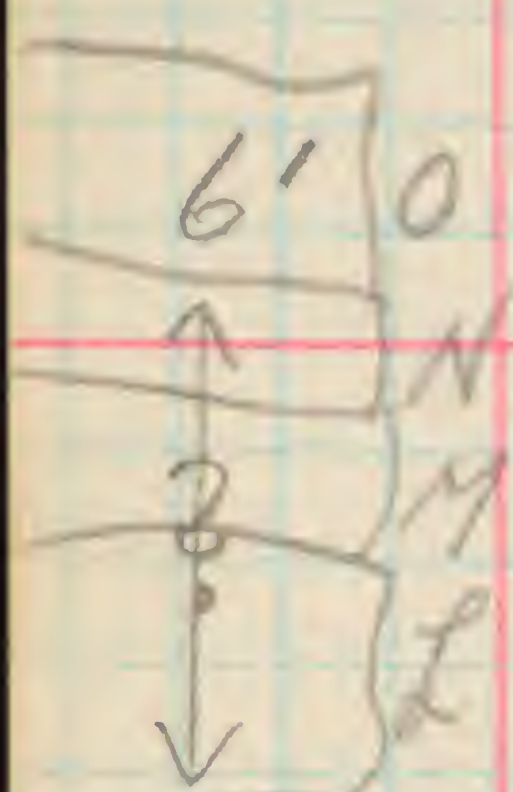
F a few blocks of crinoidal and limestone with a block of yellow limestone abounding in *Cladopora*

350
2
700
115
3' 5" 29'

200 paces up mainstream from its intersection is a mass of rock lying in stream and in boulders dipping 38° ~~and~~ SW and striking N 50° W. The chonetes zone is present and 10-15' above it comes *Microcyclus*. 20' above *Microcyclus* is a zone of abundant small *Athyris*. The *Athyris* zone is at 225 paces south of intersection.

(23)

1968
1803



To pass north from tipped over beds comes Microcyclus again N25° W 50° NE. Returns out 60 feet above Microcyclus some peculiar branching of Stal 12 of yesterday. It is 97 paces to first Microcyclus from stream intersection.

Section on road S. of Ridge Sch.

12 1/2' K

2' J

10' H

112' G

3' F

11' E

16' D

40' C

atypia

16' B

15' A

A - Microcyclus zone - Shaly limestone with upper part becoming thicker bedded sand with much yellow clay N75-80° W 35° NE. Microcyclus is restricted to about the lower 6'.

B. Heavy bedded limestone with abundant small atypia at top (upper 15')

C. Mostly heavy bedded limestone and shaly ls. partings. Heavy beds at bottom. Mostly covered to upper 8" which is laminated yellow ls.

D. - Mostly covered but upper 2' consists of hard fine-grained ls. with *Chonetes cordatus* abundant.

E. - 11' covered.

F. - 3' of very hard granular limestone abounding in *Chonetes coronatus* and *Cystiphyllid* corals in upper foot.

about 10' above F comes a loose block with many small *Chonetes*.

(24)

1969

1863

G. is a covered interval.

H. - is 3 ledges of cherty ls. looking like Alts but with *Chonetes*. probably 10'.

I. is a short covered interval

K. - is 6" ls. at base then 10' + shale with abundant small *Chonetes* overlain by 2' limestone with abundant *Chonetes*.

L. - covered

M. - shale much weathered.

N. - covered

O. - is 6' light brownish gray cherty ls. with sp. much like *Strophodont*. A few more feet probably present because free fossils occur in float for several feet above outcrop.

Tropidoleptus occurs just under the first *Chonetes coronatus*.

1970

(25)

1970

Generalized section
~~Wittenburg~~ - Ridge School - Union
 School.

over for section of H
 10'

6'

I

Hard ls. with Stropheodonta

146±

190±

98=238±

288±

H

Shaky ls with cherty ls.
 ledges all containing
 abundance of small
 Chonetes. Full thickness
 not obtainable

10'-25'

G.

Granular ls with corals

30'±

F

Limestone with Tropidoleptus
 C. coronatus. and

40-50'

E

Limestone with "Newberia" at
 top.

16-20'

d

Limestone with small
 Athyris

5'-6'

c.

Limestone, cherty with
 Microcyclus

77'

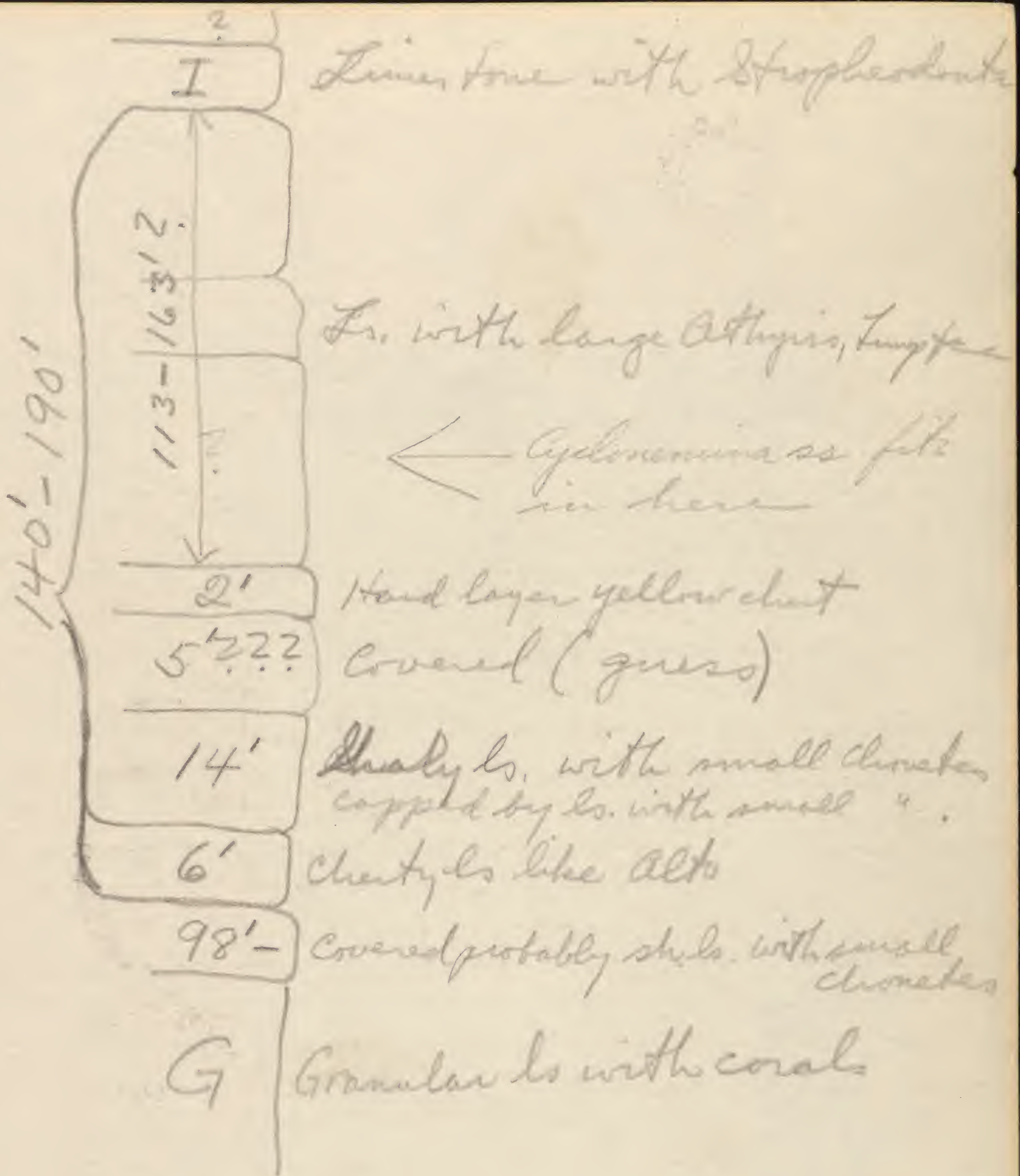
B.

Limestone with Sp. brevis

5'

A-

Heavy bedded ls. with A. spinosa



(26)

1871

1971

August 17

Study of hill southwest of Ozona Hill with quarry

On NE slope of hill a zone of digitate Favosites was seen in the St. Laurent 82' below the top of the hill.

In morning went over hill at quarry. Also afternoon collected from Grand Tower west and north of the Boardman School. At base strike is $N14^{\circ}E\ 6^{\circ}E$

A¹ The lowest 5' is in hard limestone abounding in crinoid debris, some elongate thin corals, scattered light yellow chert, occasional Favosite heads, and a few brachiopods. Fish fragments and large Paracyclops occur.

A² The 5' interval is light brownish gray, coralline in lower part but without the corals and thinner bedded towards the top.

A³ Third 5' consists of rock similar to before but becoming more massive above and with scattered big cephalopods. The upper layers have a very irregular surface and are in beds up to 6" thick. Large Strophodonts, small coarse-bedded Spizfer were seen.

25' B

16' A

B. - The next 25' are composed of brownish gray fairly hard rock breaking into lumps and having a distinct bituminous odor when

(27)

1972

freshly broken. All but the bottom foot of this bed abounds in the brachiopod *Schizophoria*, occasional Favosites, small elongate, narrow corals,

August 18.

Section on St. Laurent Creek, 3 miles SSE of St. Marys.

Section run by tape and taken vertical to strike. Strike on second sandstone layer $N 72^{\circ} W$. dip nearly vertical

A = total of 42'

A' - An 8' bed massive sandstone showing little bedding. Texture about that of granulated sugar.

A² - 15' - thin bedded light colored limestone containing sand-grains.

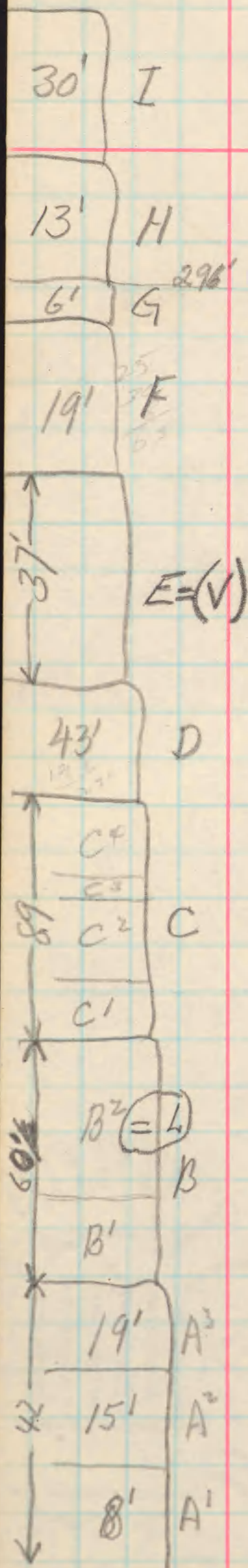
A³ - Crossbedded calcareous sandstone 19'

B - ~~68 1/2~~ 60'

B' - basal bed of about 8' very fine-grained calcareous ss. Then a covered interval of 18'

B² The remainder is thin-bedded shaly breaking limestone to the base of a heavy ledge on which a tree is growing. Fossils become abundant in this interval.

296
956



B² - 10' below the top of this interval *Sp. andaculus* is very abundant and 7' below *Sp. andaculus* a large new *Chonetes* is common. N65°W 73°N

C - 89'

C¹ - Lower 25' contains scattered fossils with *Spiriferonatus*, a small *Camartoechia*, small *Chonetes*. The rock is heavier bedded than below, impure brownish gray, fine-grained limestone. in thick beds forming the bank at a meander of the stream.

C² - About 25' of impure limestone in thick beds crossing the stream and making a small fall. Fossils not seen.

C³ - 8' of hard calcareous ss. The upper layer is ^{calc.} ss with fine quartzitic ss standing out and appearing like quartz.

C⁴ - 30' 7' hard gray limestone with quartzitic chert. *Cystodictya*, *Atrypa*, *Pliocops*, small *Chonetes*.

D - 43' covered.

E - 37' Heavy-bedded limestone Brownish gray in color containing many fossils: *Cystina*, *Sp. muchonatus*, *Cystiphyllum* (10' below top). *Diplura*. N85°W vertical

(29)

F - 19' Covered 1871

G - 6' - Lower 4' massive ledge of grayish brown limestone containing small *Cystiphyllum*, small *Strophodont* and sp. *micronatus*. The upper 18" is a limestone conglomerate (perhaps intraformational), *C. coronatus* d.

H. 13' black fissile shale with brown streak.

I - 30' covered to next limestone a white marble-like limestone with thick lenses of chert. 65' horizontally downstream from I comes granular limestone with *Bellerophon* *Spinifer* and *Rhipidomella* *dupia*. The strike here N 85° E and with a steep N dip.

The upper part of G contains *C. coronatus* in abundance.

Coronatus ranges through the whole thickness of E and almost to the top of G. The total range thus is about 60'.

1101

(30)

1925

Aug. 19¹⁸⁷⁵

Section in glen south southeast
of Ridge School.

Handlevelling begun near head
of glen, rock exposed 55' from
top of divide between gullies.
Consists of rotten limestone with
Strophodonta demissa, *Sp. mucronatus*
and seems to be same rock as
exposed at top of gully seen on
Aug. 14. Top bed $N 20^{\circ} E 7\frac{1}{2} SE$

95' to layer of chert. Next 15' comes
shale with *Chonetes* to road which is
at 440'. Thus the chert bed is at about
455' and the top bed is at about 495'
Chert bed Strike E-W $19^{\circ} N$

Aug 19'

Reconnaissance of stream from road
corner NW. Downstream to house on
top of hill to west of stream are
occasional exposures of the shale
of the St. Laurent which is a leached
argillaceous limestone. The thick
chert bed was seen and also the
Athyris zone which also contained
a large *Limoptera*.

South of the road corner and
about 100 yds upstream is a
good-sized exposure of shales
and one leached hard sandy limy
band abounding in *Sp. ancladulenta*,
Leptostrophia, small *Chonetes* and
in a thin layer lower down *C. coronatus*.

In these gullies the
presence of *P. flabellum*
suggests all is below Ludlowville.

(31)

1970

Beside the old abandoned road south occurs a small glen. 14' above a lot of yellow chert in the stream bed, which I think may be the same chert that occurs 15' above the road south of the Ridge School occurs blocks of sandstone for 10'. It is brown, case hardened, white to brown sugary ss. when fractured it contained small *Stropheodonta* and *Cydonemina* in abundance.

40' above the ss are loose blocks of light yellow gray fine grained ls. with scattered crinoid debris. *Athyris* only fossil seen besides crinoids.

From the top of the ls to the road is 40'. The ss bed is thus 80' below road level. The ls marks about the top of the Hamilton at this place. The ss occurs at 5-70'.

500
12

458

32

1977

A19² - Wittenberg - hillslope on
west edge of Wittenberg

?
8'± B
3± A
?

A - About 3' of fine grained, granular
brownish gray limestone abounding
in *Tropidoleptus*, also *Leptostrophia*
Rhipidomella

B. 8'± with about 1 1/2' oolite in
basal part and light gray granular
limestone above all packed with
a variety of corals. At top foot
corals are not abundant and
yellow chert appears in the top
3'.

(33)

1978

August 20 to west
Reconnaissance from road $1\frac{1}{2}$ miles
northwest of Ridge School over to 76-Creek
across divide to Aug. 19 Creek and
back to Ridge school Road.

A20 - first rock encountered is
hard brownish gray limestone
containing *Sp. lucasensis*, exposed in
bed of road 15' above first crossing
of stream and road over divide.
Stream crossing to N side road.

80 paces downstream is an
exposure with *Sp. lucasensis*? dipping
 25° N 70° W and striking N 20° E.

145 paces limestone with small
Chonetes striking N 10° E with low
dip east

225 ^{paces} came a fault breccia. At
340 stream and road cross,
stream on SW side. Fault breccia
20 paces downstream from this
intersection.

At 575 a glen on NW side of road
with loose blocks for 20' vertical
with small *Chonetes*, large *Paracyclops*
and *Schizophoria*.

At 700 paces comes cut in hill
and stream road crossing. Stream
to NE. Rock in cut contains *A.*
spinosa. 844 stream-road cross
stream to SW. At 1000 paces
comes tributary glen from SE

34500
625
3125

1000

1250
2
2500
625
3125



(34)

1973

290 paces up glen we saw *Sp. lucumina* in the limestone. Coral bed occurs in "Starland" Creek $S 30^{\circ} E$ of house on hill.

① 500 paces upstream from coral bed occurs a layer of shale with two thin limestone bands $N 37^{\circ} E 11^{\circ} SE$. About 30' of shale exposed. In the limy ledge 20' above base occurs: *Athyris*, big. cephs. *Strophodonts*, *Limoptera*, *Homotoma* a regular *Delphi* fauna.

② 600 paces comes another exposure $N 33^{\circ} W 30^{\circ} NE$. heavy bedded shaly limestone much leached with yellow rotten chert of which a thick 1' plus layer forms the base with about 15' above it. *Sp. mucronatus* is abundant in the chert.

③ 655' - 15' $N 54^{\circ} W 31^{\circ} N$ rotten cherty limestone abounding in small *Chonetes*. This suggests the Alto-like limestone above the coral bed. These beds above the coral bed may represent the "Delphi" facies of the Alto. 10' chert under + 40' under bottom
1250 paces to bend in road where we started.

④ 100 paces upstream from bend in road $N 45^{\circ} W 36^{\circ} NE$ shale containing heavy limy layer.

68
1300
325
1675

near bottom and limy layer near top. Sequence from bottom shale 3' ls. 1", shaly with thin ls 10', limestone q. The one foot ls contains *L. perplana*, *Sp. andalus*, small *Cyclonema*. Saw *C. coronatus* here yesterday.

In the small glens west of the road down to the creek the *Cyclonema* ss. occurs resting on 3' of silty leached limestone. $N40^{\circ}W$ dip NE.

The ss is about 4-5' thick with the bottom bed about 1 1/2' thick brown fine grained ss. with few fossils. The next layer is about 1' thick or 9" thick with many fossils. The next bed is brownish ls about 1' thick on which rests blue clay. The top ss bed contains many *Cyclonema* & *Strophodont*.

Some distance above Hamilton east of road leading S of Ridge School black shales occur under a few feet of limestone (Mississippian). On the ls. is a green clay, then a covered interval followed by Mississippian limestone. We saw no trace of the *Cyclonema* sandstone.

The sandstone with *Cyclonema* at the top of the Hamilton was followed from the Ridge road turn-off down to the creek for about 0.2 mile along the slope. It occurs in most of the little

gullies west of the road to the creek. In the farthest west gully possibly 0.1 mile west of house on ridge the ss had descended nearly to the bottom of the glen and we saw little likelihood of picking it up farther to the west. This sandstone may form the top of the Hamilton. Above it was blue clay but most of the 40' between it and a limestone on the slope was covered and the interval may be shale. Although the upper ls. contained an *Atyrid*, the fact that it is unleached may indicate it to be Mississippian. Above the limestone are 15'-20' of yellow weathering dull white chert with a fossil suggesting *Reticularia laevis*. I think this chert is Mississippian.

In the glen just east of ridge school, middle fork, above the Hamilton on the slope of the glen came a foot or two of black shale, glauconitic limestone (thickness not determinable) with a few fossils. Then a greenish shale interval and Mississippian limestone after a covered interval above the green shale. The limestone might possibly be Louisiana?

6 1/2 miles S. of
Little Saline
Valley N. of Independence
Sch. 21

(37)

1882

August 21 1982

A21- Tossed blocks of limestone and ss along old road showing presence of St. Laurent. One block contained *Prasmatophyllum* and abundant corals including many *Cladopora*. ss. blocks abundant in *C. coronatus*, *I. carinatus* and *Strophodonta demissa*.

Went to locality 1 1/2 miles west of Lithium but failed to find any fossils.

August 22 Lone Star School

A-A' are exposed just downstream from ford

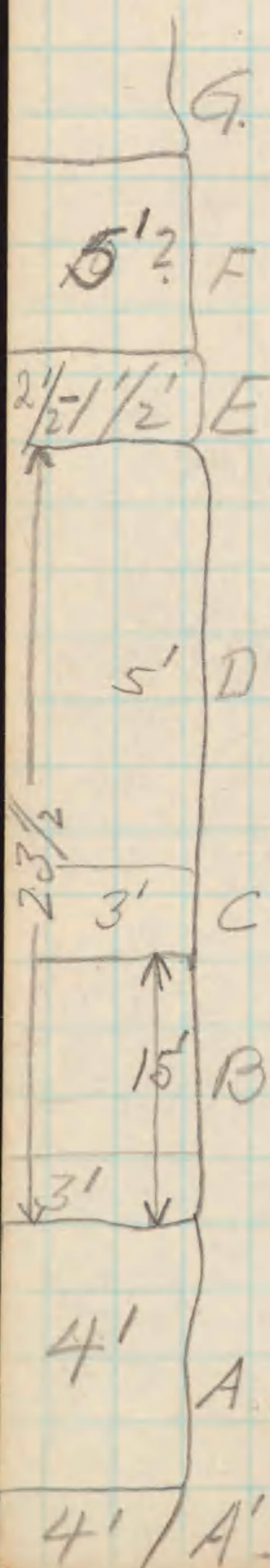
A - Thick ledge of hard smooth gray limestone containing small cavities filled with calcite. No fossils seen. A' - 4' dolomitic irregularly bedded ls. with Silurian fossils at water edge

B - covered in lower 3' but upper 2 1/2' composed of earthy gray, shaly fracturing limestone containing fossils

Pentamerella, wide-hinged *Spinifer*. Small *Atrypa*. Contains also scattered yellowish chert. Total about 15'.

C - More solid ledge of yellowish gray limestone containing corals, *Lophophoria*, *Atrypa*, *Pholidostrophia*

Silurian.



(38)

1983

D- 5 feet of yellowish granular crinoidal limestone, the crinoidal debris well scattered, containing corals, *Pholidostrophia*

E. $1\frac{1}{2}$ - $2\frac{1}{2}$ of calcareous ss when fresh but fine grained between granular ~~at~~ sugar and table salt in texture. Abounds in fossils. This ledge is as much as $2\frac{1}{2}$ ' thick. Big *Schizophoria*, big *Atypa*.

F-3-6' ? or 3' green soft shale
See below

G. Louisiana ls. (not measured)

Just west of the house bed E of the Devonian forms a water falls. 67 paces upstream from this falls comes the lithographic Louisiana limestone in the stream bed and opposite the house. I guess there is only about 3' of shale ? between the ss and the Louisiana

A and A' exposed downstream from ford and top of A for about 50-75 yds above ford. Section taken in bank about ~~75 yds~~ 75+ yds above ford.

(39)

1984

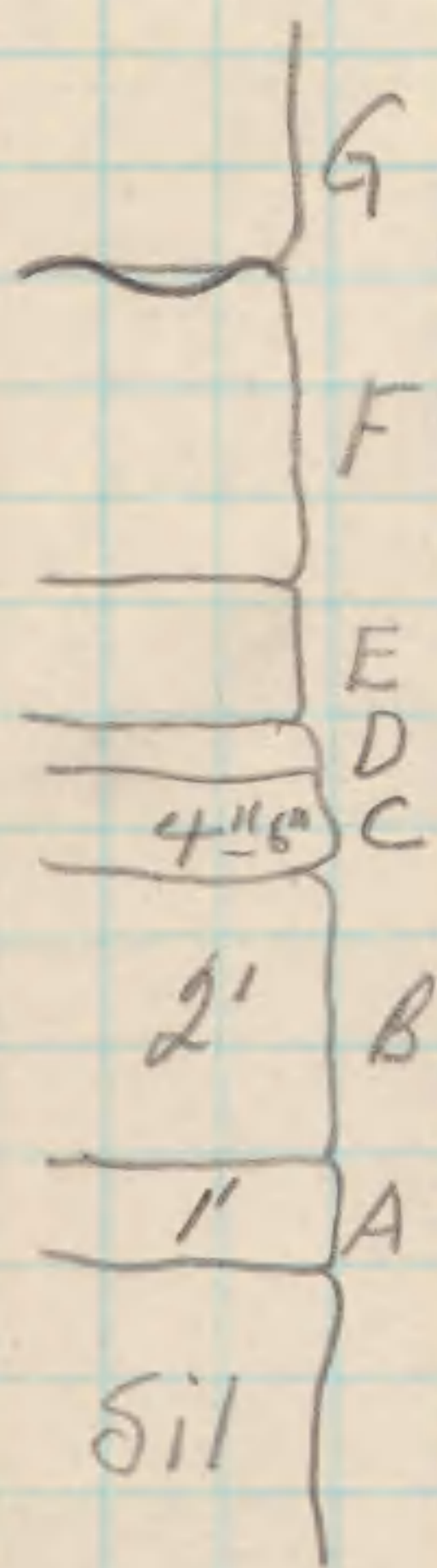
1884

Sandstone is 25' above stream level about 95 yds above ford but is in stream 60 yards below house

ASW thinks the green shale F is the same as that seen just below (SE of Ridge of shoo) above the limestone I think was Glen Park or Louisiana.

August 23

Section behind ME Church in Hamburg, Illinois



A- 10"-1' of sugary brown ss. with small cup corals, *Prismatophyllum*,

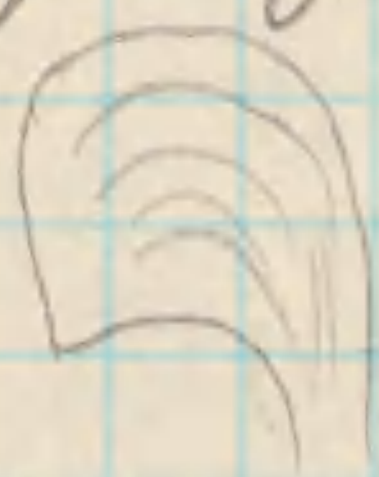
B- 2' brownish thick-bedded shaly fracturing limestone containing scattered corals, large *Strophodonts*, large wide linged *Spinifer*, digitate *Favosites*, moderate sized corals, this bed suggests the upper 5' of the Lake Star section below the ss.

C- 4"-6" of hard limestone granular, brown to yellow-gray. Contains cup corals.

(40)

1985

D- 2" sandstone veneer on C marked with *Taonurus* or *Spirophyton* and other worm tubes.



The tubes filled with green shale of the overlying bed. This ss. contains chitinoidea debris, cup corals, *Atrypa*, large *Spirifer*, coarse-ribbed *Atrypa*. Sandstone fine-grained, yellowish brown, limy.

E- 1' green fissile shale

F- 3'+ lithographic Louisiana ls much channelled limestone with *Schuchertella* whitei.

G- Thinly laminated cross-bedded =
ls. Hannibal? or probably upper Louisiana

A23' = NW 1/4 SW 1/4 18-105-2W

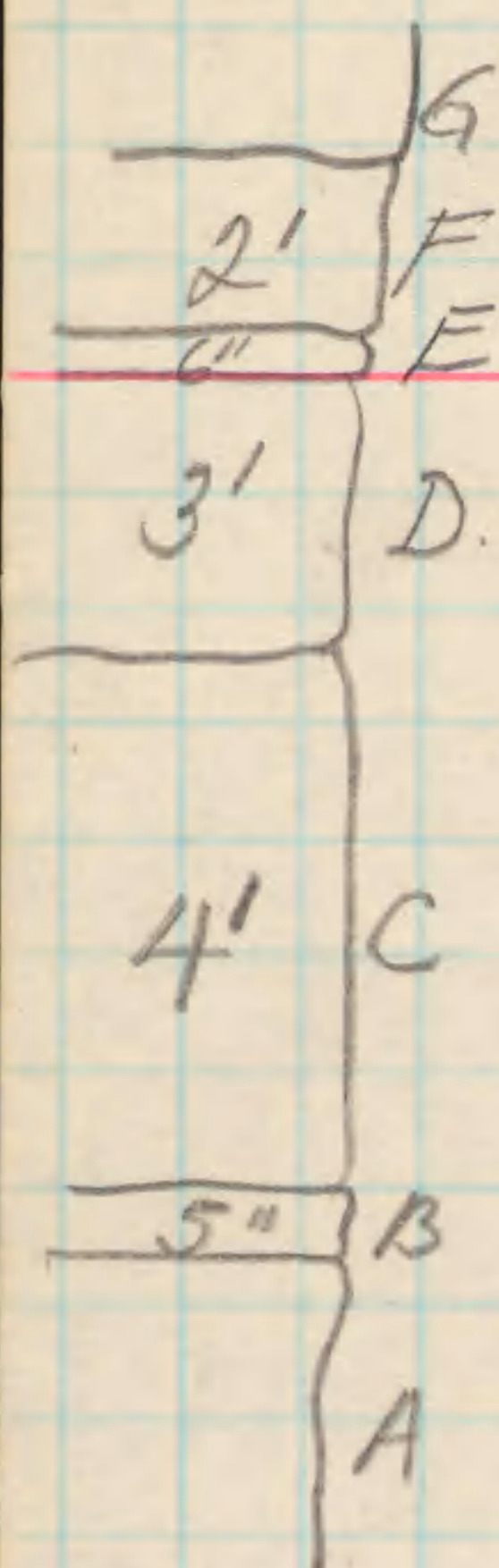
A = Silurian? without fossils and no effort made to get them.

B- 5"-hard calcareous bed with many small cup corals.

C- 4' earthy gray to yellow gray fairly thick bedded limestone having a shaly fracture into irregular plates. Fossils abundant.

(41)

1986



large wide *Spirifer* in bottom foot,
Pentamerella, coarse-ribbed
Atypa (*bellula* type) in lower 3".

The upper 2' contain modules
 of rotten chert, big *Stropheodonta*
Pholidostrophia, large
Spirifer.

D - 3' heavier bedded, hard
 yellow gray limestone with
 cup corals, *Schizophoria*.
 This limestone is very impure
 with brownish silt. where the
 line is leached. Upper 2' are
 coarsely crystalline ls. and
 abound in *Pholidostrophia*,
Stropheodonta and have
Cyrtina (*umbonata*?) *A. bellula*
 about 6" below top.

E - 6" green shale

F - 2' - Louisiana ls.

G. Thin bedded ss. The lower
 surface is very irregular
 indicating an unconformity.

(42)

1987
1987

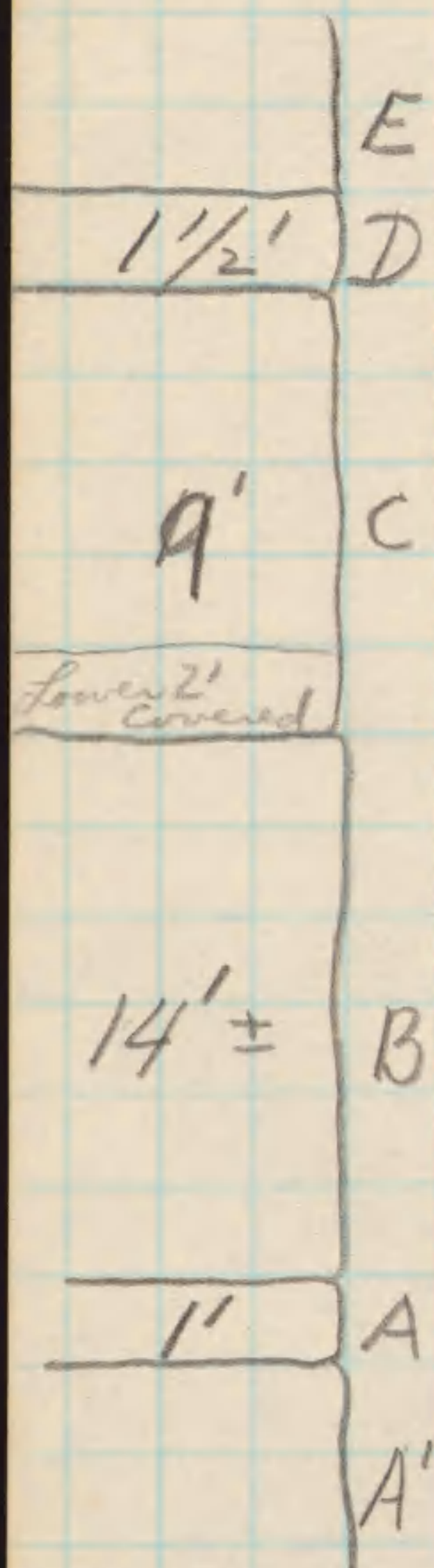
Section in Salt Spring Hollow
N Cr. 16 - 115 - 2W Hardin □.

A' - seems to be definitely Silurian and has nothing to do with the Dev. It is crinoidal and I saw what appeared to be a *Leptaena*.

A - 1' hard gray limestone in which I saw no fossils. May be Silurian. Hard, blue ls. when fresh but weathering yellow and greenish gray.

B - yellow gray earthy shaly limestone abounding in small corals in the lower foot. In the next foot *Schizophoria* is abundant with wide-tinged *Spirifer*. *Schuchertella* near top of interval with big *Stropheodont*.

C. Hard earthy limestone yellow gray when weathered. Becoming increasingly crinoidal toward the top where it has many fossils. *Cyrtina* is very abundant in bed just below topmost one. *Schizophoria* abundant in lower half of C. *Prismatophyllum* at about top and small cup corals numerous in upper half.



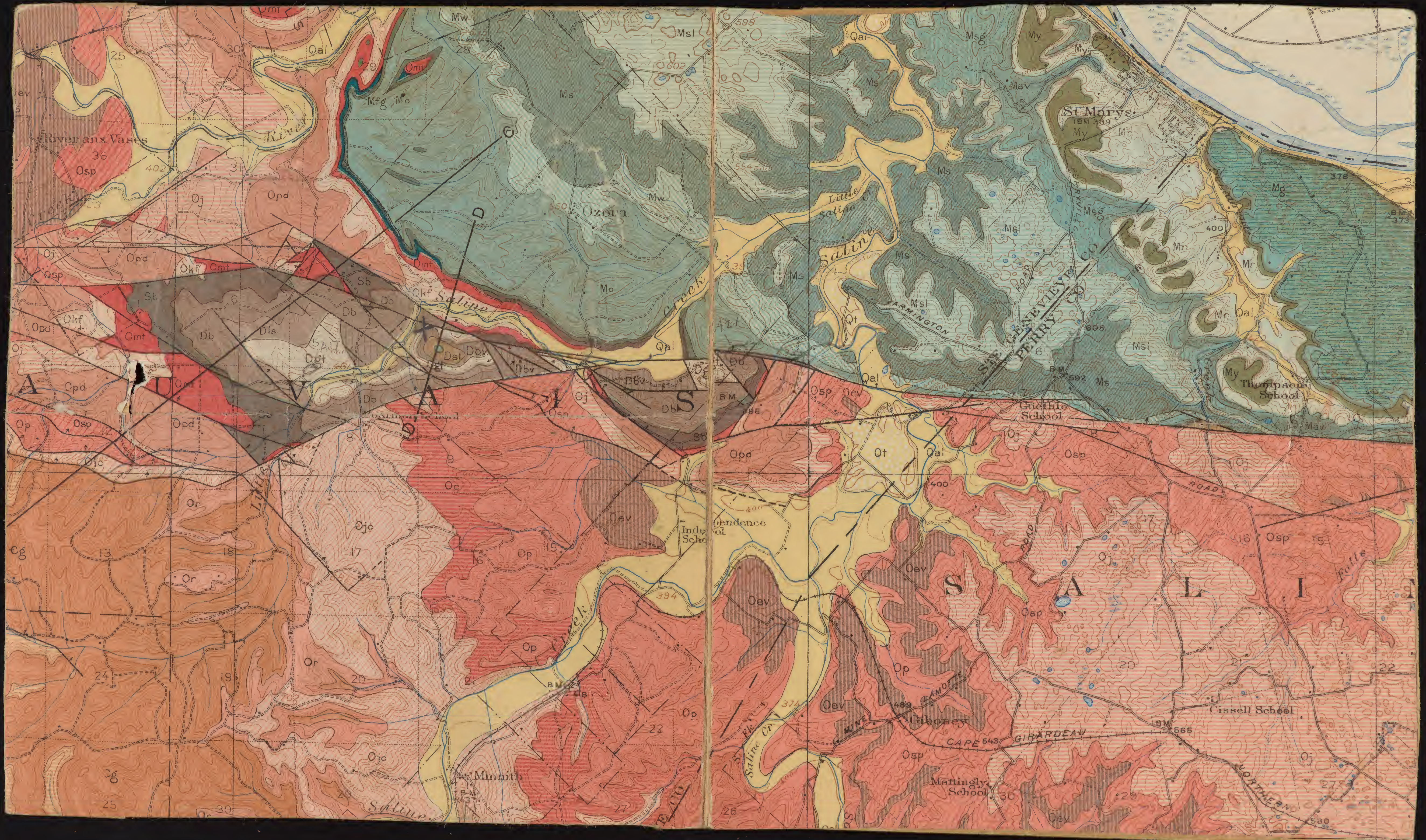
(43)

1883

D-brown sandstone, case-hardened on exterior but moderately and soft and sugary Cranaena, Athyris etc. abundant Structure of SS $N45^{\circ}E 1^{\circ}SE$. The top surface of the ss is covered by Tridacnals, some of large size. Large cupcorals occur in the ss.

Handleveling a side-gully produced 23' as total thickness.

E-green shale in bank at top of SS.



(44)

1989

August 24.

Spent morning in first hollow south of Kitesville. Collected for about 2 hours. Walked up Hollow $\frac{1}{4}$ mile up from spring. Found loose ss blocks near spring but never saw them in place. It is possible that the fauna from this place belongs in the basal foot at Salt Spring Hollow where *Cystiphyllum* is common. This coral is fairly common in the fauna south of Kitesville.

Right after lunch we visited the hill slope SE of Batchelor but saw no continuous section. The Silurian makes ledges $\frac{1}{3}$ - $\frac{1}{2}$ way up the hillside but the Devonian is not well shown. One piece of ss float indicated the presence of this layer. The median layers of the four feet present are hard yellow brown limestone with crinoidal debris.

Monterey

School

The top of the hill at Monterey School is made up chiefly of Devonian which is about 11 feet thick. The upper inch or two is a veneer of fine-grained ss. The upper 6-8 feet are the best exposed. Where fresh the

(45)

1890

upper 5' are bluish hard limestone with cup corals and *Prismatophyllum* in the top layer.

Schizophoria is abundant 15"-18" below the top. *Cyrtina* occurs near the top. Wide-limbed *Spirifers* are abundant throughout. The *Atypa bellula* type occurs in the upper beds. *Pholidostrophia* and a large *Stropheodonta*, possibly *halleri* also occur. When weathered all but the uppermost bed seems to check into thin plates. In the middle and lower portions shaly parts weather yellow brown. On the whole the section here is more homogeneous and calcareous than the beds to the north.

Top layer here is 1"-2" of fine grained ss in stringers mixed with limestone and containing rolled fossils. This may represent the ss bed.

(46)

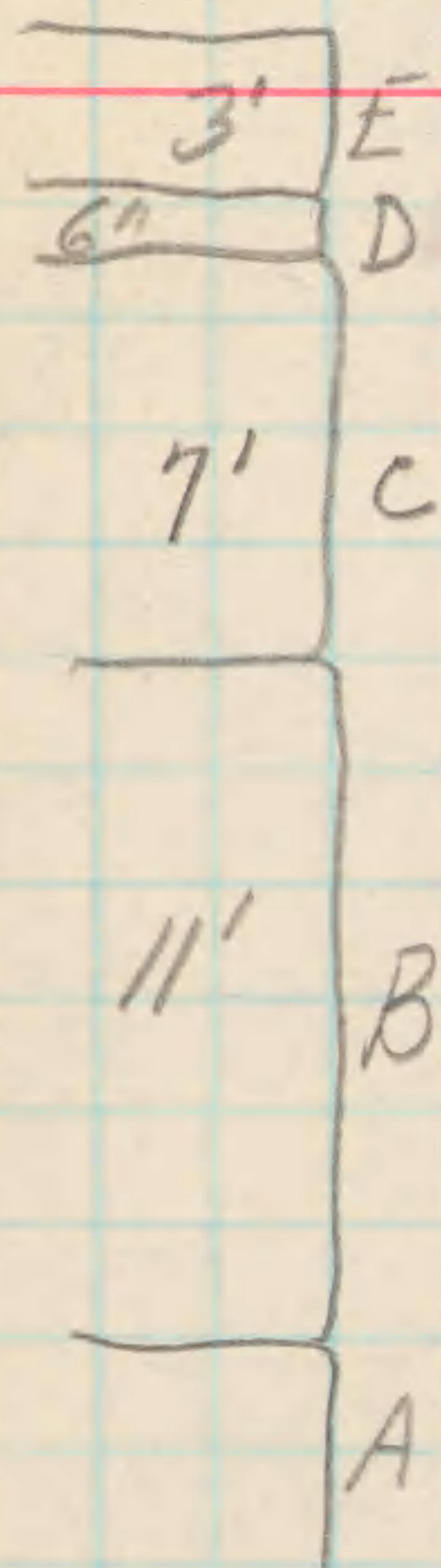
1991

1991

August 25

Section along old road

NW 1/4 SW 1/4 B-115-2W, 2 miles
SSW of Hardin, Ill.



A - Silurian

B - 11' fairly heavy-bedded
yellow-weathering argillaceous
limestone becoming heavier
bedded and somewhat more
crystalline toward the top.
Large *Spinifer* is present in B.

C - Harder heavier bedded ls.
containing much shell debris
with many small *Atrypa*,
Pholidostrophia, small and large
Stropheodonta, large rolled over
Favosites. *Oryzina* abundant in middle
in a breccia

D - 6" ? covered

E - 3' ± Lithographic Louisiana ls.

No ss. was seen in this
section either in place or loose.
The *Solon* fauna was not seen
at the base.

(47)

1992

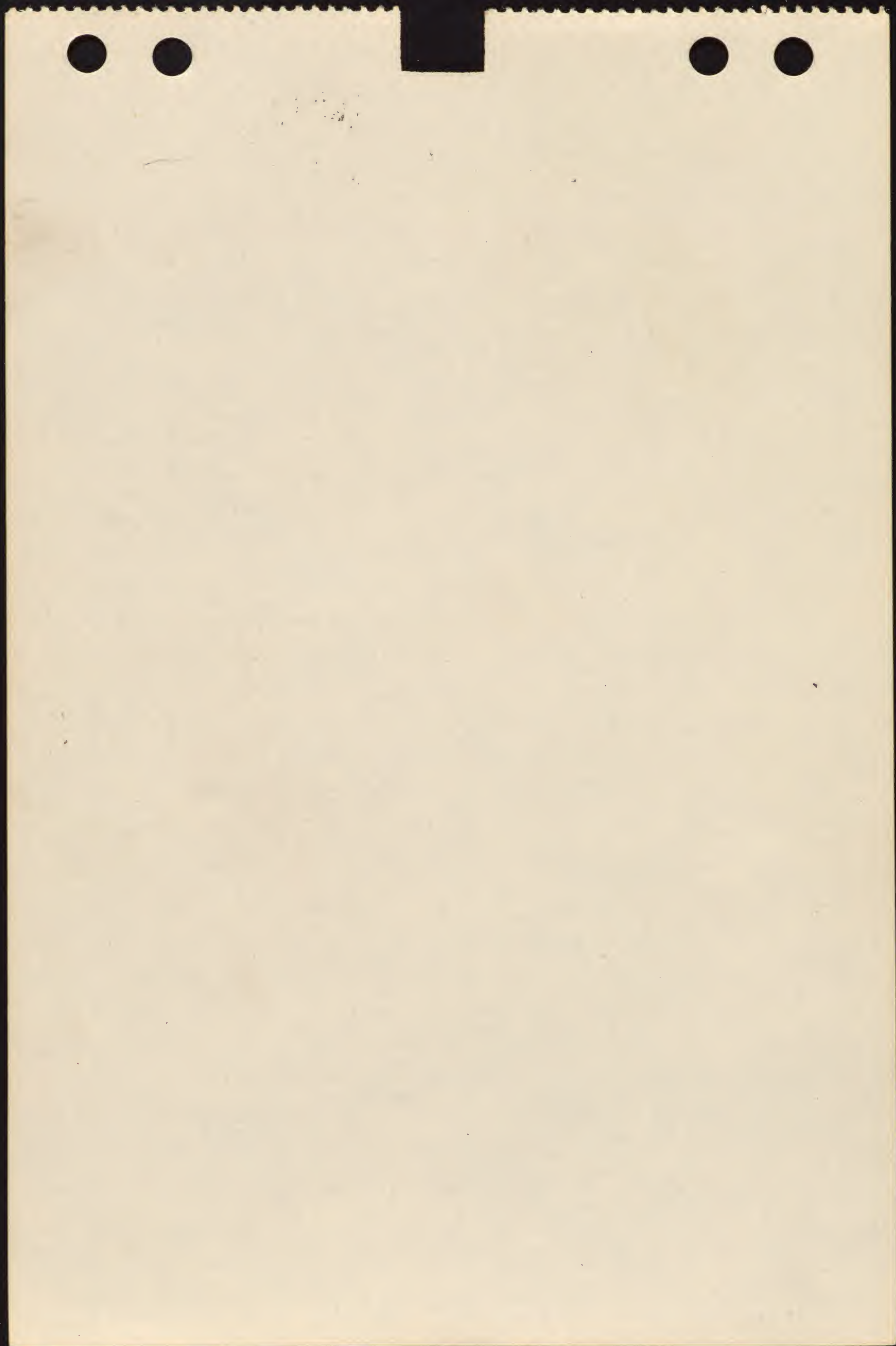
Center east line NE $\frac{1}{4}$ 22-115-24W =
Aug. 25!

8' upper part Devonian
heavy bedded limestone approximately
corresponding to C. of previous
section. The slabs stream about here
show abundance of small *Atrypa*,
Cyrtina umbonata, small water worn
cup corals, small *Strophodonts*,
Pholidostrophia, *Sclerophoria* about
4' below top, wide-hinged *Spiner*.
Pseudostrophia

At nose of hill to north most of
Devonian except base is shown and
is about 20-23 feet thick. No ss was
seen at either place and what lower
beds are visible are of the yellow
shaly type and with well preserved
cup corals. Upper beds contain water-
worn corals.

Aug 25²

NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ 27-115-24W between
2 houses on S bank 10 feet above
stream comes contact of Silurian
and Devonian. About 10' of Dev.
showing mostly of yellow earthy
limestone with light yellow chert.
Blocks about one foot from base
yielded large *Spiner* but we saw
no trace of the *Scutellum* fauna.



(48)

1993

1993

NW corner

Kiteville N-branch

Aug 25³

NE¹/₄ NE¹/₄ SW¹/₄ 16-11S-2W

A' - hard blue ls. Silurian

A - 6" hard dark brown weathered limestone with wide-hinged *Spirifer*. This bed is welded directly to the Silurian

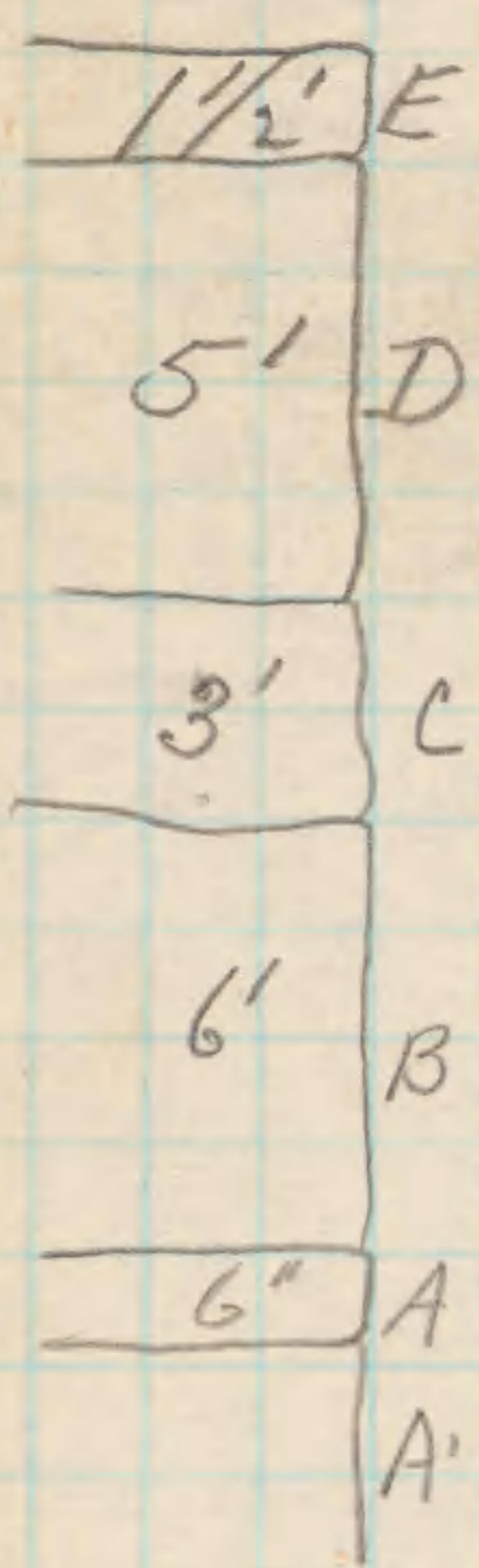
B - covered 6'

C - 3' shaly weathering limestone with many chert nodules. Yellowish earthy ls.

D - Here is an abrupt change the limestone becoming abundantly fossiliferous from having been sparsely fossiliferous. The chert disappears. *Pholidostrophia* becomes abundant. Rolled corals are scattered through. Big *Stropheodonta* is common. Some of the layers are a veritable shell breccia. Brecciated *Cyrtina* are abundant 2' below the top.

E - 1 1/2 feet sugary ss. with large *Atrypa*, *Stropheodonta*, etc.

No evidence of *Sentellina* beds was seen.



(49)

991

After visiting the above section we went back to the first hollow south of Kutzville to see if we had missed the Silurian. In walking up the creek no Silurian was seen in place, nor was any Silurian float seen. We did however see some greenish clay in the ^{bank} not far above the main road which we took to be Maquoketa shale. Maquoketa shale also appeared on the slope of Herhill just SW of the W in Section W. This suggests some sort of structure. The *Scutellum* fauna was seen nowhere else on the quadrangle except in this one little patch. Cloud & I stated that 8 feet of these beds are present but after seeing the place again this figure seems very excessive. What I probably mean is that 8 feet intervene between the base of these *Scutellum* beds and the first of the yellow platy limestones.

(50)

1895

Aug. 26

Jerseyville Hollow

A 26

0.4 mile N of
City line, 1 mile

N of main St.
in Jerseyville
Hollow

F. - Dark bluish gray shale
with conchoidal fracture and
brownish white streak.

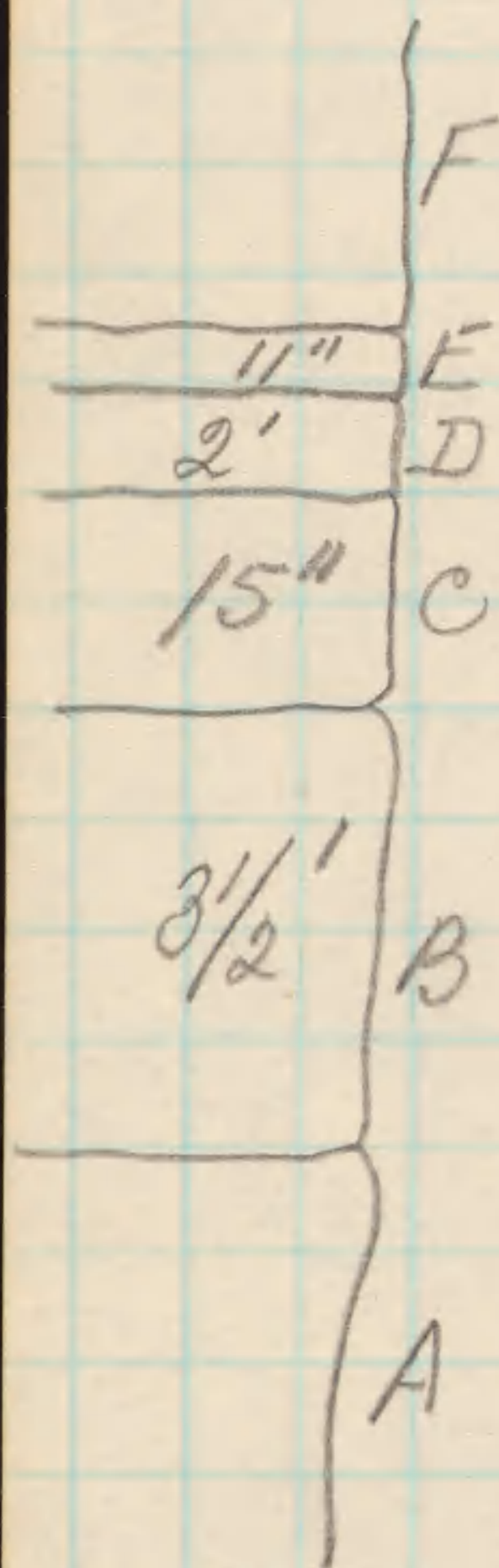
E - Gray, thin bedded limestone
with green glauconite? and oolite
at base. Fossils like those of
Hamburg oolite. - 11"

D - Black shale 2'. Contains
brown spores. Fissile, breaking
into thin flat plates. Brown
streak.

C - 15" of brownish gray, thin
bedded shaly chert ls that
breaks into thin plates with
irregular surface. Cavities filled
with large calcite xls are common.
The fauna is sparse consisting
of *Leptostrophia* a, *Atrypa* ac,
Cyrtina umbonata? and a small
Spirifer, *Dymphoceras*.

B - 3 1/2' - light gray to yellowish
ashen, earthy ls. breaking into
conchoidal plates. Bluish worm?
markings but fossils not seen.
Leptostrophia very rare

A - Yellow dolomite - Silurian.



(57)

2898

1996

Aug. 26¹

Section along road, east side
0.7 miles south of Otter Creek,
Center W line 9-7N-13W.

A - Silurian

Loess

7'

C

B. Shaly weathering thick bedded limestone with abundance of chert nodules. *Pentamerella*, big *Spirifer*, small coarse ribbed *A. bellula*, scattered cup corals,

7'

B

C. The cessation of chert and a few different fossils separates the two layers. Bed B contains much chert but the fossils are more scattered. C contains in its lower part big *Stropheodonta*, *Cyrtina*, *Pholidostrophia* abundant, scattered cup corals, *Schizophoria*, *A. bellula* type. The top is quite massive and hard with big *Spirifer*, Scotty found *Leptostrophia* in upper beds. Topmost bed is 6" thick very hard and partially dolomitized. No ss was seen.

A

(52)

1997

August 27

1997

Holts Summit

A - Jeff City

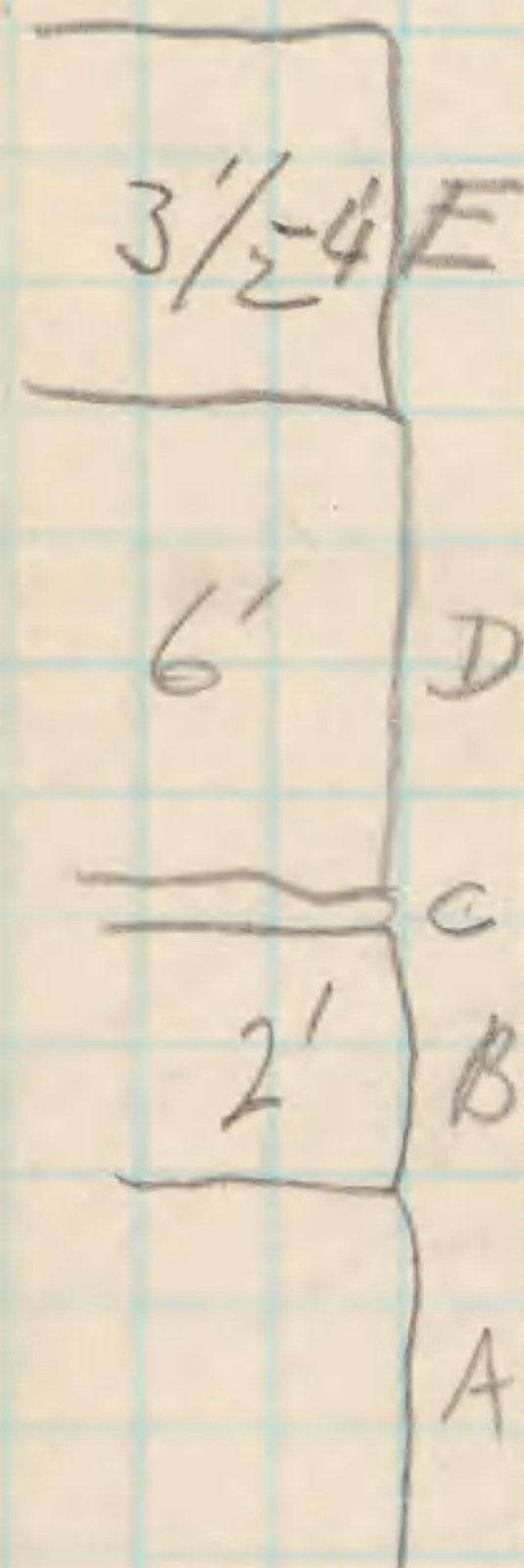
B - ss 2', hard white

C - green shale parting

D - 6' massive ledge, very fine grained almost lithographic ls with few fossils.

E 3 1/2' - 4' light gray ls packed with fossils. bed *Strophodont* abundant in lower foot. 1/2" - 3/4" shale 6" above base with *Strophodont* upper 2 1/2' abundant in bed *Schizophoria* + *Syringothyrus*

Bed D varies up to 10 1/2' and bed E thickens to over 6'. At top of E is 1/2 foot of ls. with *apcorals*. The swelling of these ~~reefs~~ masses suggests a possible reefy origin. This might explain patchy nature of Callaway.



(53)

1893

August 28.

In morning set out for Mineola and Danville. Rained for 2 hours but we went to see Mineola $\frac{1}{2}$ mile north and $\frac{1}{4}$ mile west of Danville until lunch time. In afternoon went to headwaters of Whippoorwill Creek where we saw Callaway.

The Callaway here contains reefy masses of gray algal limestone forming Trench Cove surrounded by hard heavy-bedded platy brown limestone often crinoidal. On the brown ls. comes gray limestone with scattered cup corals and *Crinacna* and a few other fossils. This overlies brown ls with fine lined *Atypa*. Above all comes heavy bedded limestone but I did not determine its thickness.

(54)

1999

August 29
Section on Mission 19 about 1
mile N of Big Spring.

A - pinkish crinoidal ls. fine
grained - Kimmswick or Joachim?

B - Light yellowish or cream
colored fine-grained limestone
with considerable sand

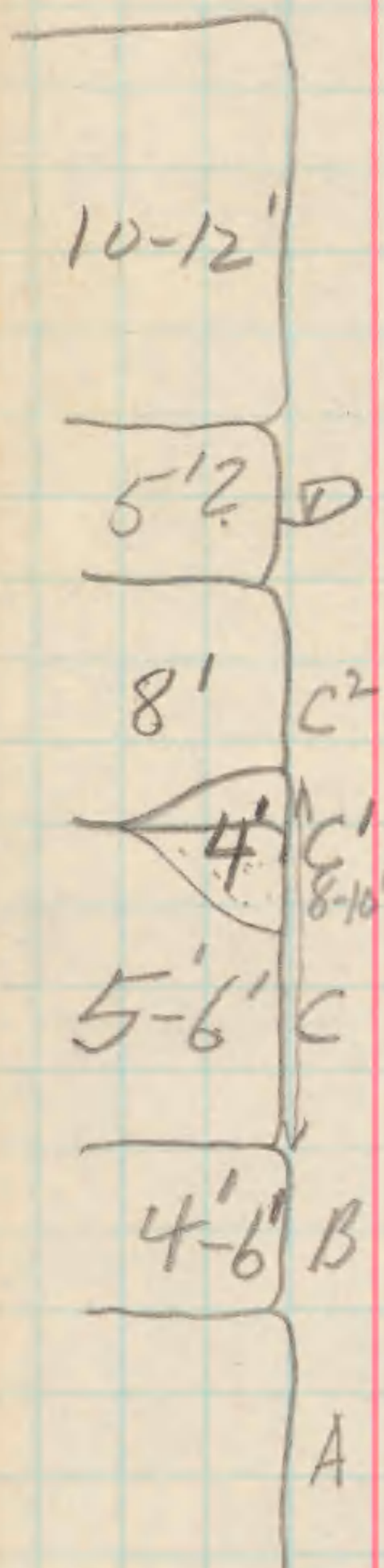
C - Brecciated gray limestone
containing rounded and worn corals
with pieces of gray stromatopora
in a matrix of fine gray limestone

Bed C is channelled or thin
uphill and in the lower gray
C¹ - crinoidal limestone lies in
other words the biohermal material
or conglomeratic is contemporaneous
with crinoidal ls.

This limestone continues up to a
culvert and its total thickness
must be about 12' although
it is impossible to be sure.

D - mostly covered but about 1 1/2'
of hard bryozoan ls.

E - Biostrome beds. Thin layers
6" of smooth or fine-grained
limestone separated by irregular
bands of bryozoan and coral



(55)

debris. Cup corals & bryozoans predominate. Near top comes *Cranaena* beds. Some layers are a mass of bryozoans. Algae are common. Small bands of hard white sand occur between the ss beds.

Quarry 2 miles N of
Danville

Thick bedded blue gray limestone about 12'-15' thick, lower half containing thin shale partings between the thick beds and containing cup corals, large *Stropheodonta*, large *Schizophoria* and large *Syringothyris*. This portion clearly corresponds to the upper part of the Callaway as exposed at Dicks Summit.

Upper 6'-7' is more laminated rock of similar color to that below but containing biotremal material in form of broken bryozoans, algae, and cup corals. The *Cranaena Camerophoria* bed comes just above the lower 7'.

On top of the Callaway and appearing transitional to it is a sugary yellow ss.

Took picture here (9)

(56)

2001

County N one mile N of junction with
Old US 40. on NW 1/4 SW 1/4 NW 1/4 29-48N-6W

Roadside, County Road N about
3/4 mile E of Williamsburg and one
1/2 mile N of US 40. ~~SE NE 30 48N-6W~~
Actually about a mile N of US 40 (old)

"Mincola" at base rests on
Platten and seems to fill a channel
in the Platten as it butts against
it as well as overlying it to the
N. Gray cinroidal ls. with
Pentamerella, blastoids & cinroids.
about 2' thick.

A - is the Platten

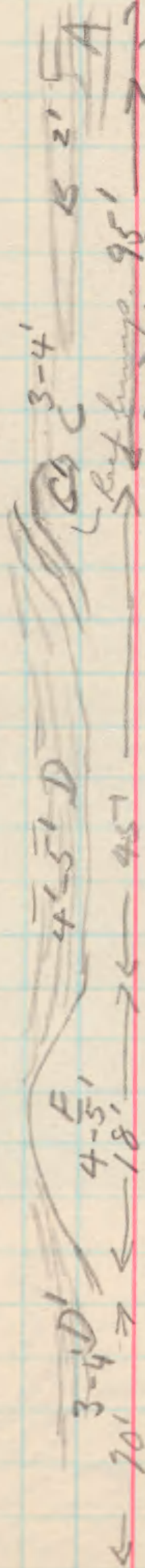
B. is 2' of Mincola-type with
cinroids and blastoids.

C. is hard blue gray limestone
abundant bryozoan and digitate
Favosites, and massive gray
limestone the flank of a nearly
hidden hump. Strombodes.

D is thin-bedded inter-reef
material with Atrypa, bryozoans
and digitate Favosites. Blastoids
and Merocrinus? present

E - massive ls without bedding
and containing many Billingsastrea
Prismatophyllum

This dovetails into D' which
is brown thinner-bedded
ls. with many corals as in D.



(57)

2002

Blastoids & Stereocrinus also present.

In front of the house at the curve are 4' more of crinoidal gray ls. with Stereocrinus, Stenocrinus and Prismaetophyllum.

James B. Barnes helped us to see these exposures.

B - The basal two - four inches of the yellowish crinoidal limestone contained black phosphatic concretions like those in the basal Beechwood. In fact the so-called Mineola is suggestive of Beechwood. This exposure indicates I think that the "Mineola" is only a phase of the Callaway. The bed B is difficult to follow S along the road as it seems to thin and lose its crinoidal character in that direction.

Took picture here (10)

(58)

2003

August 30

Bellama Springs

A - yellow gray fine grained dolomite

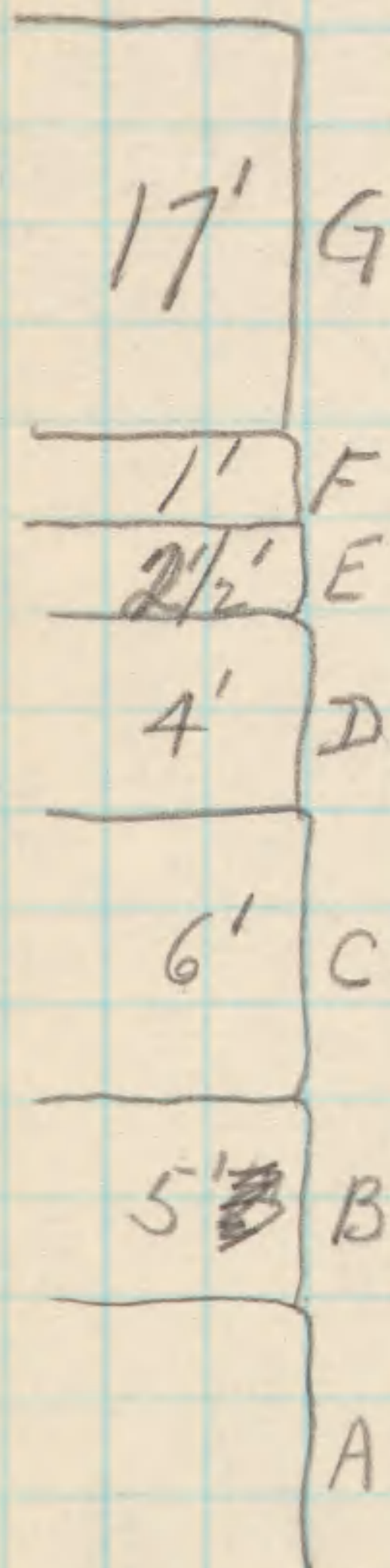
B - 5' ~~1/2~~ light gray fine-grained limestone in a massive ledge possibly a low reef, with worn *Prismatophyllum* and brecciated pieces of limestone and small lenses of ss. Upper part very sandy

C - 6' hard white fine-grained ss. forming a conspicuous ledge. possibly filling space between two reef humps.

D - gray fine-grained limestone very sandy in upper part and with scattered crinoid debris.

E - Two feet gray limestone with shaly partings above and below containing abundance of *Atrypa missouriensis*, *Cyrtina* and small spiniferid. When weathered becomes brown

F - 1' hard darker gray granular (very fine) weathering brownish gray containing big *Stropheodonta*, *Spirifer*, big *Schizophoria* *Atrypa*



(59)

2001

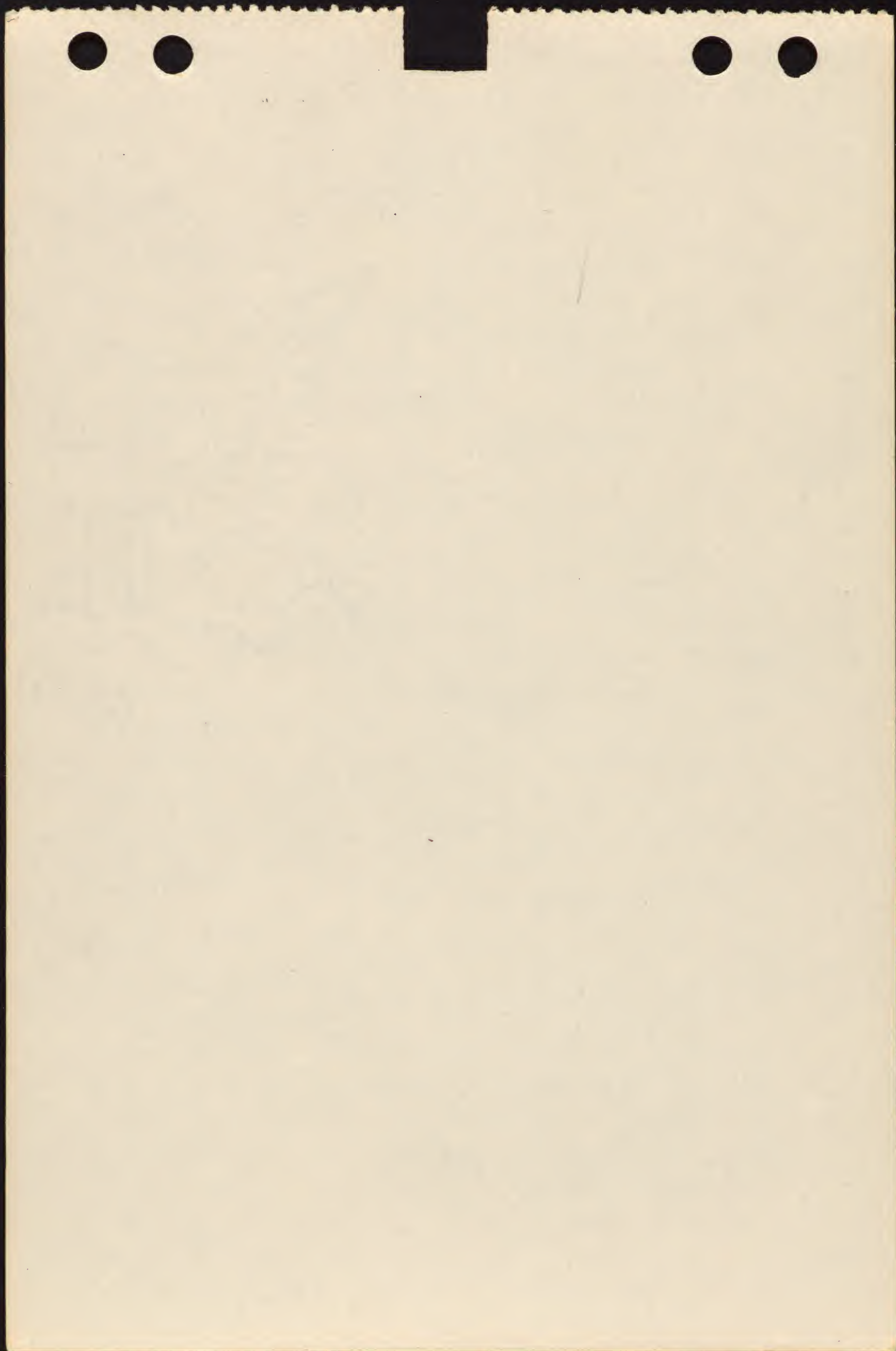
G. About 17' hard massive limestone, light gray and weathering dull gray with scattered cup corals and great quantities of thin elongate algae or bryozoans. Uppermost beds lighter colored and smooth. Small *Crinacra* occurs in about the middle.

Aug 31

On Missouri R. bluffs along RR west of Bonne Femme River Cooper resting on Jeff City with good unconformity. Conglomeratic at base. St. Peter coming in upstream about $\frac{1}{2}$ mile! Callaway with few fossils resting on Cooper with unconformity.

Newberry beds.

On US 63 south of Ashland 6.1 miles (3.3 miles south of Hartsburg intersection) road to east with cattle tank on south east side of intersection. Take country road 1.25 miles east, bearing right at fork, to small school-house on hill. Inter-mittent stream crosses road



(60)

2005

and beside it an old road.
~~Follow old road and~~^{on foot} stream slightly
north of east for about $\frac{1}{4}$ mile
to Newberia ledge. Here 4-5'
of limestone are packed with
Newberia and a few cup corals
and Favosites. Chert is 10-15'
thick with upper 10" just below
Newberia fossiliferous.

Follow woods road on foot
keeping to center road as two
forks go off road. Center road
is on south side of creek about
 $\frac{1}{8}$ mile from school. Road and
creek become one at outcrop.

$$\begin{array}{r} 69 \\ 12 \overline{) 828} \\ \underline{24} \\ 58 \\ \underline{48} \\ 10 \end{array} \quad (6.8)$$

P

6462

2006

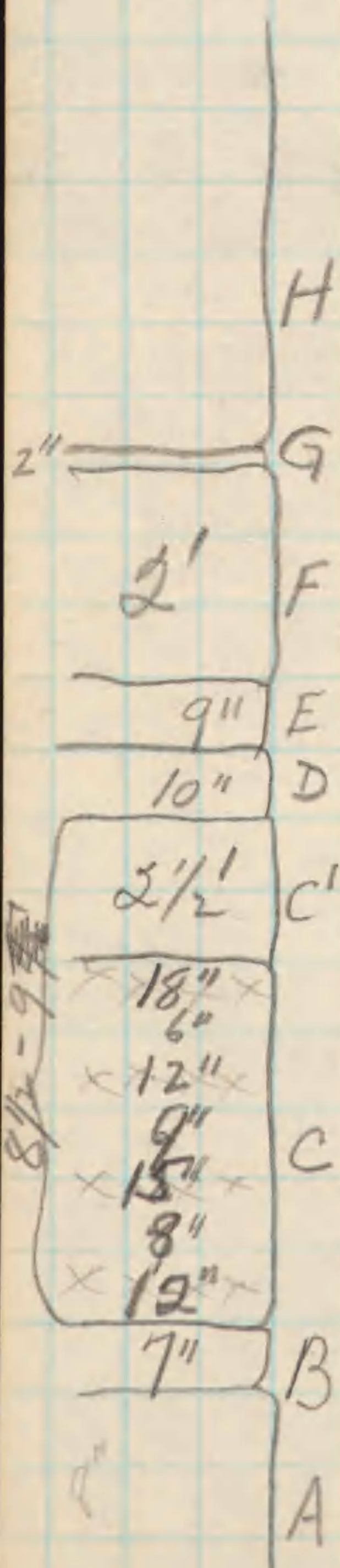
September 1

Bobs Creek, near Brussel, Mo
Sec. 34, Center E line SE 1/4 34-50N-1E.

A - Magnopeta

B - gray to yellow gray ~~limestone~~
limestone, fine grained, earthy
with numerous phosphate
modules up to two inches

C - C' - About 9' of yellow brown
weathering, fine grained earthy
limestone divisible into several
separate layers. C - consists of
four distinct layers of small
Cystiphyllum the lowest layer 12"
separated by about 8" of yellow
brown earthy limestone with
wide ~~Spirifer~~, ~~Stropheodonta~~, small
~~Atypa~~. When fresh this layer
is earthy blue gray. The second
Cystiphyllum band is 15" thick and
is separated from the third by
9" of limestone, blue gray to yellowish
containing Stropheodonta, ~~Favosites~~,
wide Spirifer, small Atypa. This
is separated from the last thick
coral layer by ~~to~~ 6" of blue gray
earthy ls. The top Cystiphyllum
bed is 18" thick. These thicknesses
are approximate as the beds



(63)

2007

varying in thickness. C'- about 2 1/2' similar limestone containing scattered *Cystiphyllum* and some chert nodules in upper foot; also digitate *Favosites*, wide hinged *Spirifer*. *Tentaculites*, *Strophodonts*, *Stictopera*, *Elythra*.

D- 10" hard thick ledge earthy limestone with *Spirifer*, large cup coral, *Strophodonts*, *Schizophoria*

E- 9" shaly limestone making a retreat over which F hangs as a ledge.

F- 2' hard yellow limestone forming a massive ledge.

Abounds in fossils: *Strophodonts*, *A. bellula*, *Schizophoria*, wide hinge *Spirifer*. Much yellow-brown chert in the bed. This bed is weathered clean but no rock was seen in contact with it along the stream. Green shale occurs downstream some 20 yards and ~~probably~~ overlies the Devonian in a small rill.

A few loose *Cystiphyllum* were found above the outcrop and a 2" layer of loose chert probably representing the uppermost layer contained Devonian

(64)

2003

fossils.

G. - chert - 2" with *Cystiphyllum*
and *Atrypa*

H - Green Saverton shale
directly overlies outcrop in a
small rill near center of the
exposure.

This outcrop suggests chiefly
the lower half of the Calhoun
County sequence, about through
the prominent *Schizophoria*
bed. *Cyrtina* is not abundant
and some of the upper layers
may be absent. Total
thickness is $13\frac{1}{2}'$.

This place was difficult to locate
at first because the road to
Bussels has been relocated. The
road now crosses Bobo Creek a few
rods north of the outcrop which is
readily visible from the road as
one crosses the stream. The crossing
with Bobo Creek is about $\frac{3}{8}$ mile
due west of Bussels and is thus
in center east line SE $\frac{1}{4}$ 34 - 60N - 1E

(65)

2009

September 2.

Hill on west side Mo. 79 about 2-3 miles N.N.W. of Elsberry. We climbed to top of hill overlooking RR and found the hill roughly divisible into Magnoloba and Silurian. The rock at the very top is a white, dense, stylolitic limestone. At base of cliffs some 20' below top of hill I saw small cup corals, *Cliftonia*? and a *Strophomenoid*. All the rock above the Magnoloba, is Silurian according to my view and not Devonian as mapped.

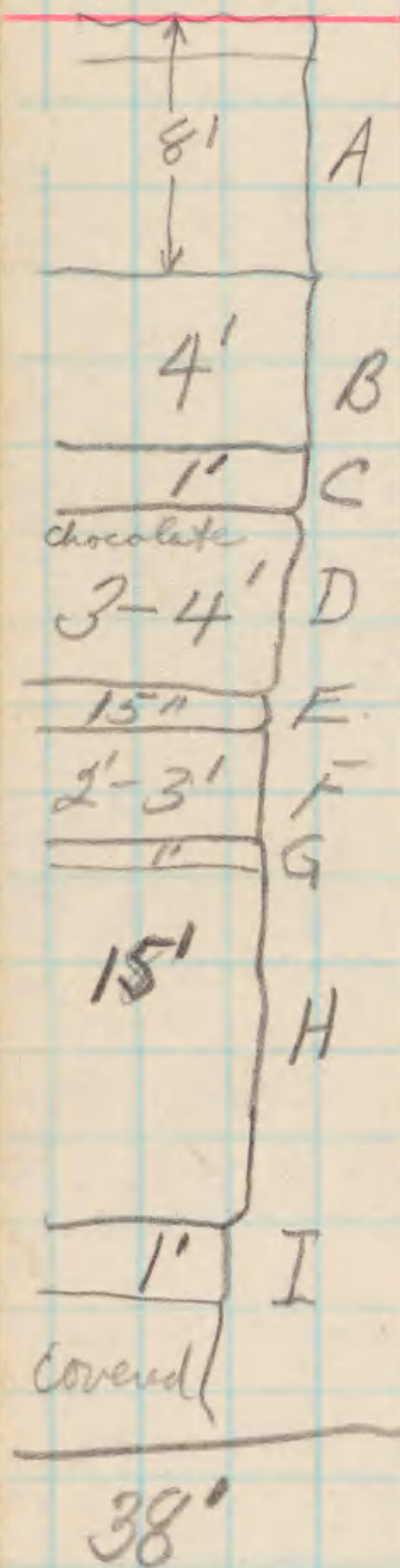
(66)

2010

September 3.

Section along Creek W $\frac{1}{2}$ 11-56N-SW

Section begins 500 paces from old bridge.



A- 8'- gray earthy calcareous shale with layers of earthy limestone which may not yet have slacked into shale fragments. The upper 2' is yellow-weathered ls. inside and yellow gray outside. Occasional *Newberrya*.

B- 4'- hard earthy fine grained limestone breaking in thick conchoidal plates at a high angle to the bedding. *Atrypa* 85 paces down from B comes a foot of shaly ls. abounding in corals. This probably belongs to the massive bed B.

D- the coral bed rests on chocolate colored dense, lithographic ls. with big calcite nodules.

For the next 115 paces from C (700 paces from bridge) we walk on the top of the chocolate bed to a point where 3 $\frac{1}{4}$ ' of limestone is exposed. The chocolate bed makes the top ~~and~~ with ~~sub~~-cracked light gray limestone below. These can be followed for 200 paces (900 paces below bridge).

At 900 paces is a small fall over another chocolate layer E.
E- 15"

(67)

2011

F - 2'-3' gray limestone enclosing some blocks of chocolate at 945 paces. This bed rests on thin platy limestone G.

G - 1' ? thin bedded oil calcareous oil rock with black layers of carbon, fish scales? and plant fragments.

At 1020 paces leached ~~limestone~~ sandy limestone, yellow when fractured. ~~G~~^{really} belongs to the top of the Newberia beds. At this place 1020' the Newberia ranges through 8' of rock occurring just below the oil rock. I am using H for the Newberia layers.

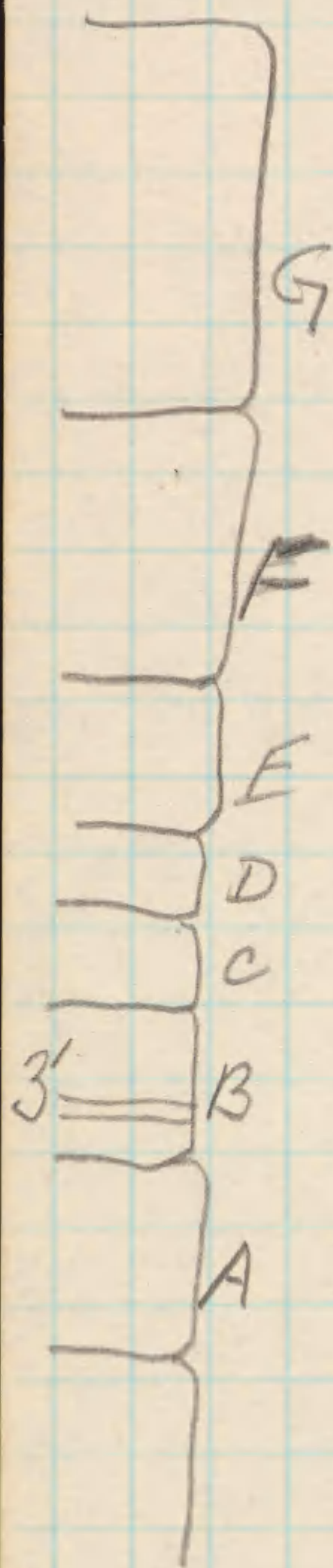
At 1281 on east side stream is a big bank of Newberia with the valves shingled together forming a coquina of the shells. At 1300' comes a bluff at bend of stream showing 9 1/2' of sandy ls. The thin-bedded character of the rock is brought into relief by solution. The sandy part standing out as thin more or less continuous ridges.

At 1378 we arrive at a chocolate bed after having descended 5 1/2' of Newberia limestone. This makes the total thickness of H about 15'. Chocolate bed I = 1 foot. Highway bridge in sec 2 at 1471

(68)

2012

Visited section in
SW $\frac{1}{4}$ SE $\frac{1}{4}$ 15-56 N-5W.



A - Kimmswick

B - 3' - shaly, greenish gray,
with 6" hard gray ls.

C - 2' dark gray ls.

D - 1' greenish gray shale

E - 8' - dark gray limestone
with 1' of platy ls. at base

F - 15' sandstone, fine grained,
conglomeratic at base with
ls pebbles.

G - 12' Limestone dark gray,
platy, fine grained often
conglomeratic

B-E = Cooper

F = Hoing?

G = Callaway.

This section is given in
Kansas Geol. Soc. Guide 1941. I
do not follow the identification
of Cooper and Callaway as
neither has fossils and

(69)

2013

2013

The presence of a sand is no reason to divide them. I suspect it is all Cooper?

After lunch we visited locality $1\frac{1}{8}$ miles south of Rensselaer, the crinoid locality visited by me in 1936. This locality seems to be about NE $\frac{1}{4}$ of ~~the~~ 15-36N-6W. and consists of at least 5 individual reef masses. These consist chiefly of brecciated smooth fine grained ls in lower part and shell & coral breccia in upper part. The masses are 10-15' thick and according to Moore in Branson section 20' of Cooper-like rock. These *Stereocrinus* beds thus must overlie the Newberria.

2014

(70)

September 4.
 Section on Cedar Creek, W $\frac{1}{4}$ 28-
 56 N - 6 W.

Section \ Faces S of bridge (2665)

2665
 5380
 1323
 6603

3'	D	A - gray smooth surf ls. some breccia 10' \pm
10'	C	B - conchoidally fracturing impure ls breaking in thick plates at angle to the bedding. Contains a patch of Newberia in middle
4-10'	B	
10'	A	C - shaly weathering gray ls and thin beds of sim- cracked shale

D-3' ledge hard gray ls.

Above D are fully 15-20'
 of yellowish shaly rock and
 a thick 10' ledge of hard ls.
 Newberia was 14' above stream
 level.

500 paces above Newberia in
 a low fall in the stream bed
 Cyrtina occurs in great
 abundance in a fine-grained
 gray brown or chocolate
 weathering rock with small

(71)

2015

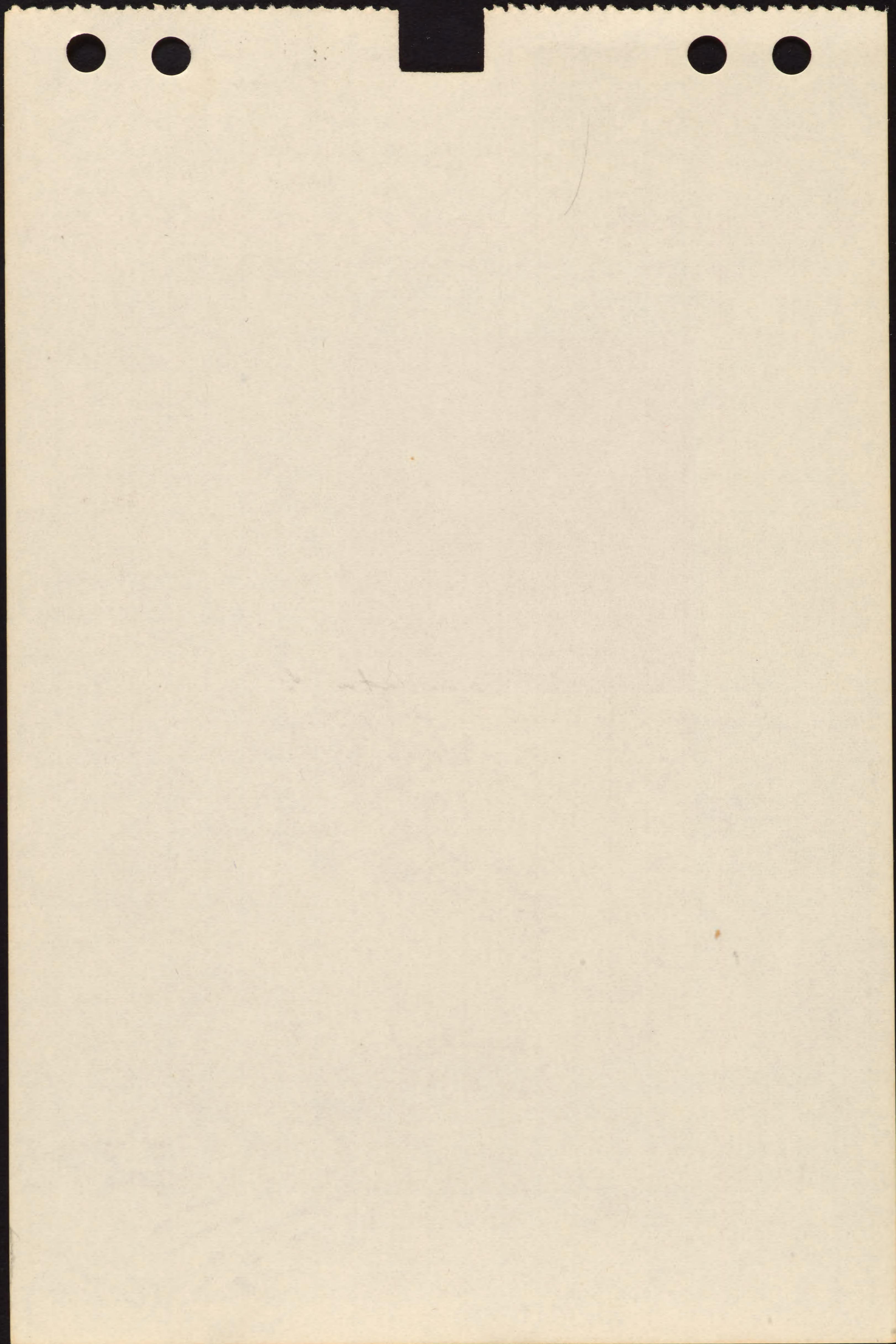
stringers of yellow to white chert.

At 847 paces many digitate
Favosites and a large subil.

At 1500 paces top surface
of Kimmswick appears. At 1800⁺
paces top of Kimmswick is 15'
above stream level. At 2015 paces
it is 25' above stream-level.

2665 paces to bridge

destinade some 20-25' come
in under the section measured
2665' South of the bridge. This
would make a total section of
about 85'. The estimate is low 40'
is nearer correct and the whole
section would be about 100' thick



2016

(72)

Section just S of bridge
about 200 paces.

SW $\frac{1}{4}$ & SW $\frac{1}{4}$ 21-56 N-6W.

A - 2' of Kimmewick.

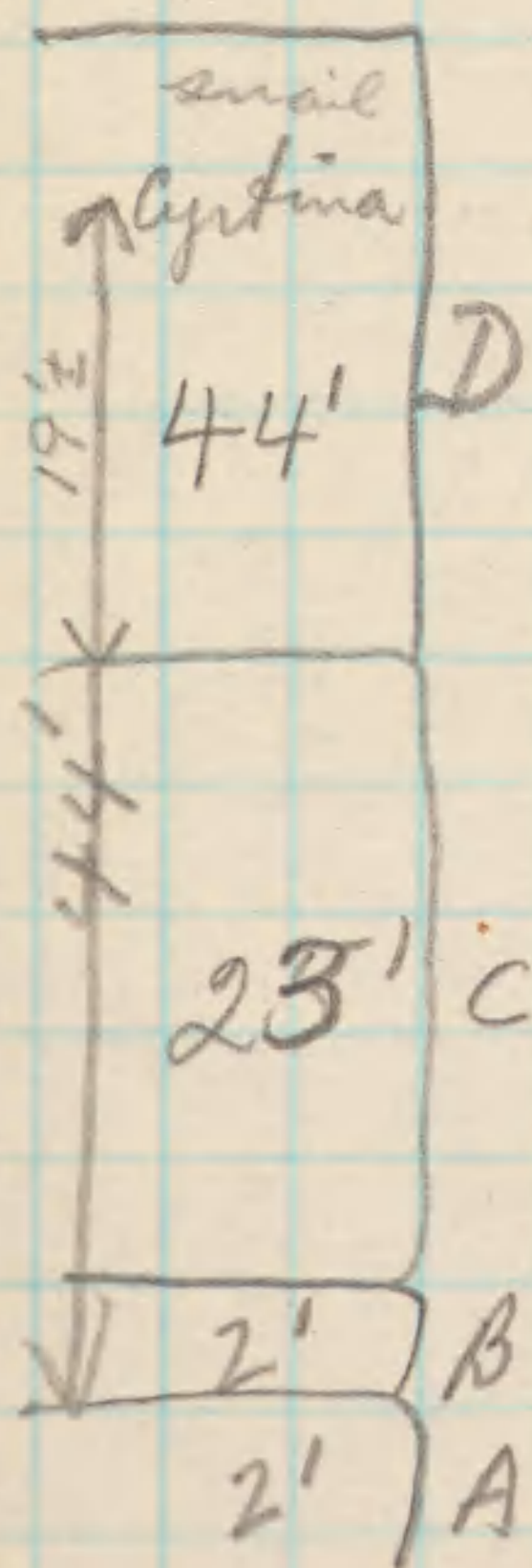
B - 2' covered

C - 25' massive light gray
limestone.

D - at 15'-22' above C comes
Cyrtina which probably corresponds
to the Cyrtina bed down the Creek.
This Cyrtina bed is about 18' below
Newberria down the Creek. This
would then add 40'. Total
thickness of D is about 44' and
it consists chiefly of shaly
fracturing light gray limestone
containing a large snail in
the top 5'.

The Kimmewick here is only
2' above stream level, thus
the Devonian here dips north
whereas farther down the Creek
it dips south about 80' per mile.

The upper snail may mark
the appearance ~~of the~~ or
position of the reef beds. The
whole 100-120' consists of
the gray limestone.



95

(73)

2017

Cedar Creek crosses road about 1/4 mile east of road corner in center N line SE 1/4 20-56N-6W but is shown incorrectly on map.

Section by A. S. Warthin

A - Kimmerswick

B - light gray brecciated ls.

C - " " fine grained massive ls.

D - " " fine grained massive with Cyrtina + Chert 4'

E 8' - light gray platy weathering ls.

F - 10' light gray ^{subj.} lithography weathering nodular. ~~bedded~~
~~bedded but some are~~

G - 4' - 10' laminated massive, impure, buff ls. with Newberia in middle of 4' part. 2' bed of corals ^{cap} (4'?) Newberia same as 9/3/42.

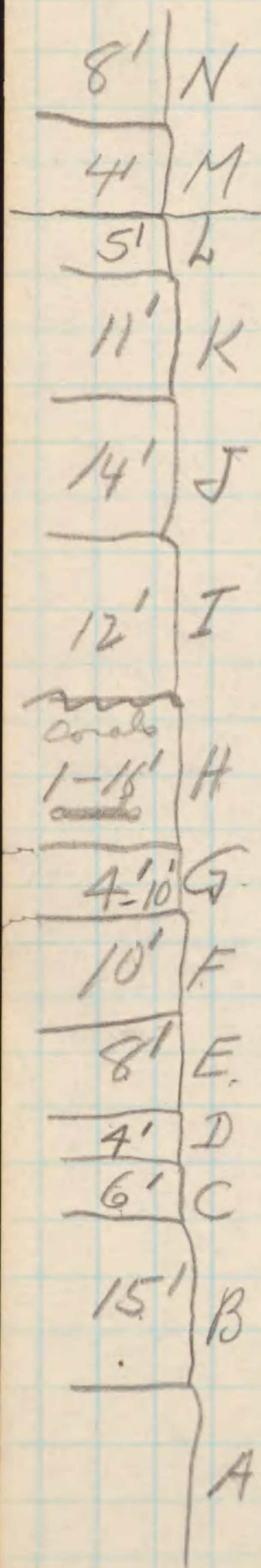
H - 1' - 16' light gray sublitrographic, top 3" cherty; 4' below top prominent chocolate layer.

Unconformity

I - 12' buff, laminated ls with fine sand & rare chert

Many Spirifers in basal foot

The whole section is very monotonous and of a



(74)

2013

J-14' light gray finegrained dense massive ls. Solid ledge.

K- light ^{gray} irregularly bedded fine grained ls with large subil & digitate Favosites

L-5' covered

M-4' Louisiana ls.

N-Hannibal ss.

Total about 111'. With the 44' to Cyrtina the thickness comes to 119'. The Newbernia bed here probably correlates with Newbernia bed 4 of 9/3 section as both contain Cyrtina. Therefore coral bed with deep cupped Pysommatophyllum is below Newbernia on Cedar Creek.

~~We are uncertain as to the position of the coral bed in this section but think it is over the Newbernia bed.~~ The Newbernia bed on Cedar Creek has very little lateral extent. The whole section is very monotonous and Cooper-like throughout.

25

2019
2013
781
562
391
1953

September 5

Journeyed from Hannibal to Muscatine, Iowa. Had car serviced in afternoon.

September 6

Section along Mills Creek southeast of Milan from RR bridge S. to a point 1953' upstream from it. Outcrop about 50 yds upstream from RR Bridge is of about 3' of blocky light gray limestone, fine grained, weathering to very irregular brownish gray surface. Corals are abundant - large *Cystiphyllum*, *Billingiastraea*, *Heliohyllum*, *Stromatopora* and a few other fossils. *Prismatophyllum*. This is bed 3 of Savage's sequence.

300 paces upstream (south) from highway bridge is old quarry and bluff showing following

12'	C	A - Same as Savage's 3 with a broad shelf 3-4' above river level which shows <i>A. independens</i> , <i>Sypidula</i> , big <i>Spinifer</i> . This is the <i>independens</i> zone.
4'	B	The 4-5' above the shelf
8'	A	

(26)

2020

showing the numerous *Atrypa* contain many *Billingastrea* and thus belong the lower beds. The 8' here ~~includes the 5' of~~ I think all belongs to the Solon formation. Its upper surfaces are very rough and hackly. *Billingastrea* was seen to top of 8'.

B - 4' beginning with 6" of shaly ls. with small corals. Then about 2' massive ls. with *Schizophoria* small *Cystiphyllum*, *At. bellula*. The upper foot is the same. This I think is Savage's no 4 and belongs to the bellula zone.

C - 12' shaly weathering ls. abounding in *Schizophoria*, *Stroph. halli* and the bellula assemblage. B is the same as the lower beds (*Cystiphyllum*) of the Calhoun County sequence and as bellula goes up to the ss this may be the whole Cedar Valley of Calhoun Co.

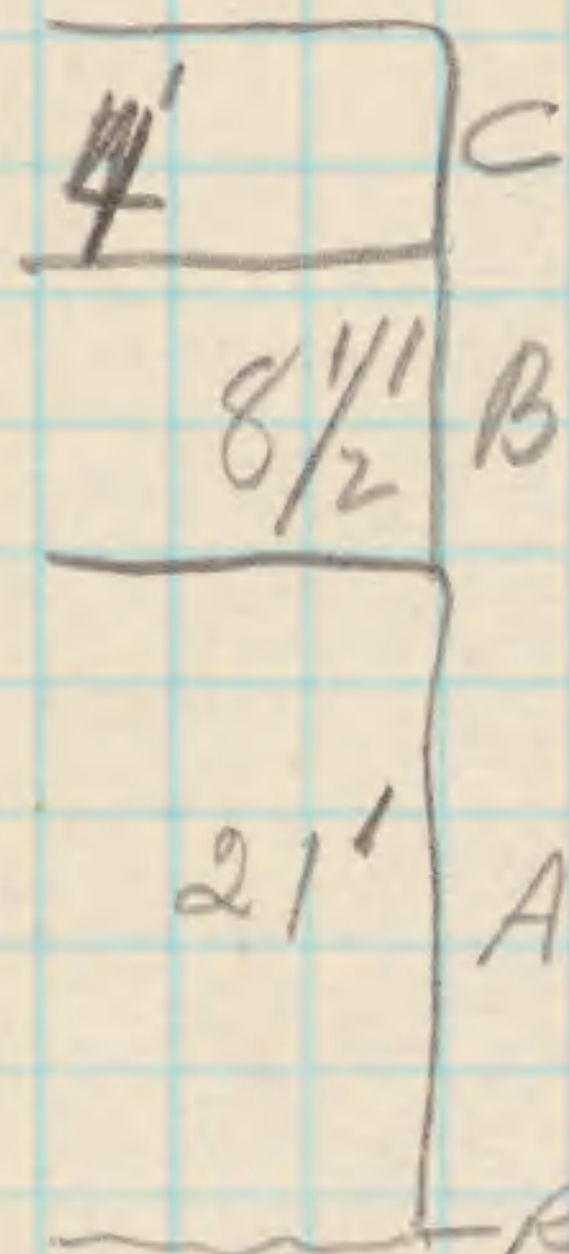
At 441 paces top of Solon is in stream bed

at 611 paces top of bed B is in river bed. The dip is strong to the south.

at 711 paces is a bluff on

(77)

on east side creek ²⁰³¹ about 25' high. At 781 the bluff is still high and a section here is as follows:



A - bellula zone, the upper part of this zone has many small *Spirifer* varicosus, fine lined *Atrypa*, *Schizophoria*, *Strophodonta halli*, massive *Byozoa*. I estimate 4' of bellula zone descended below stream at this place which makes the total 25' + the 4' of bed B from section downstream or a total of 29'.

Chonetes schucherti C in upper part. Bed B of this section should be added, to make 37 1/2' for this zone. B - 8 1/2' yellow weathering crinoidal limestone with fine-lined *Atrypa*, *Byozoa*, *Schizophoria*, *Chonetes* a., *Cyrtina*, sp. sub-varicosus type, *Strophodonta*.

C. hard irregularly bedded ls. light yellow gray in color. with *Prismatophyllum*, *Atrypa*, *Spirifer*, *Cyrtina*, *Favosites*. One layer is almost made up of *Cyrtina*. These C layers could

(28)

2022

be the top of the Calhoun Co.
sequence.

Creek in Sections NENE 26-17N-3W
~~south of Moline~~, Illinois
West of Moline,

A- 325 paces down from highway
bridge appear 3' of rock, the
lowest foot containing *Athyris* in
abundance, small *Strophodontia*.
The middle foot with yellow weathering
fucoidally marked rock. The upper
foot with *Is.* *enys* series, small fine-
lined *Athyra*, *Cyrtina*, in shaly
weathering ls.

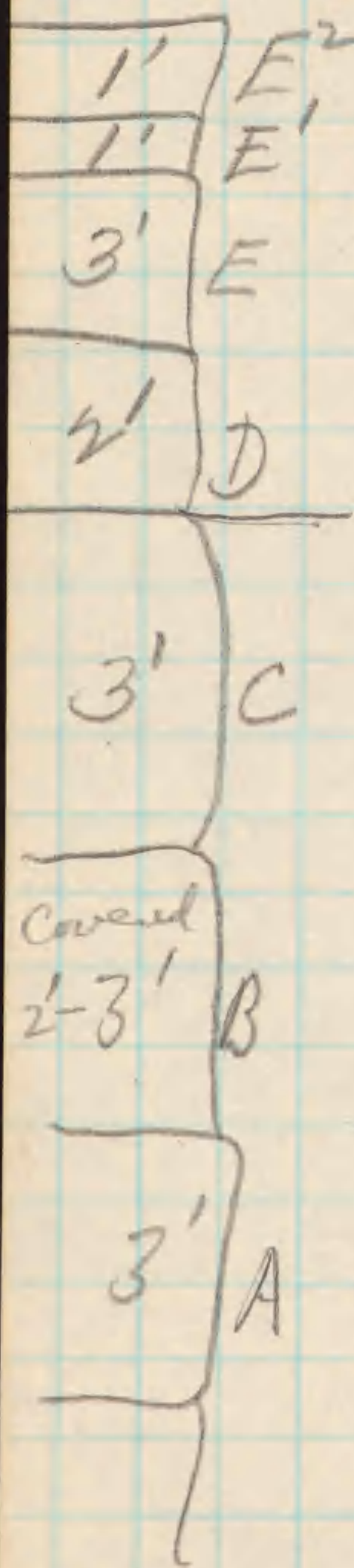
B- 2'-3' covered

250 paces above A is another
falls with a covered interval
between of 2'-3'.

C- Hard massive irregularly
fracturing ls. with large *Athyra*,
a few cup corals. The upper foot
with cup corals and *Schizophoria*.
Light gray weathering brown
& greenish gray.

Bridge and road comes at
325 paces

D Upper 2 feet below bridge are



(79)

2023

Stromatopora ls. with Cranaea
and Camenophoria

E - About 3' greenish gray
weathering to brown band
impure ls. with large
Strophodontia & Spirifer which
suggest upper Callaway as at
Holt Summit.

70 paces above bridge is
a patch of brown ls. with large
Strophodontia. This adds a foot
to E as E'.

E² another foot of dolomitic
rock making top. upper 5'
are dolomitic. We went to 500 paces
upstream

(80)

2024

September 7.

Morning rain. Went to Canaan locality on east of Buffalo and collected till 1 P.M. Then went to Sweetland Creek for a look at the Sweetland Creek form. and Upper Cedar Valley. Latter contains considerable black shale at this place.

September 8.

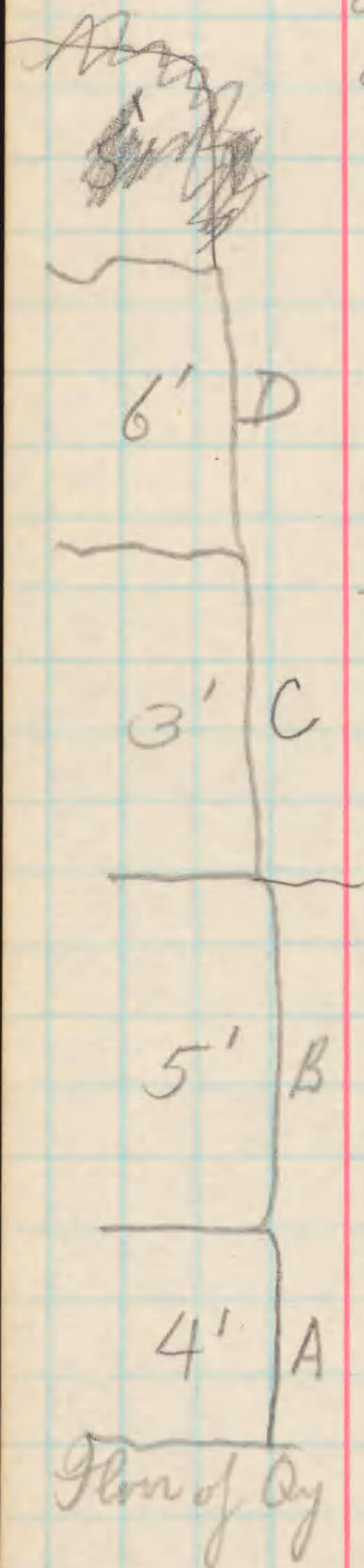
Quarry just N of US 61 ^{0.4} miles east of Linwood

A - 4' Upper Bellula zone with many *S. varicosus* & *Schizophoria*, blue shaly ls.

B - Crinoidal limestone with shaly layers. 5' Contains upper Bellula fossils with *Chonetes* Big *Spinifer*

C - sublitrographic ls. stylolitic

D - 6' ~~dark~~ gray ls. containing *Athyris* at top. crinoid debris



(8)

2025

In afternoon visited both large quarries east of Buffalo. The one at Linwood showed a section from Davenport to uppermost *Bellula* zone. In west end of quarry a large sink or cave filled with Pennsylvanian shale and ss is exposed.

In the quarry (Dewey Portland Cement Co Plant) at Linwood Sta the section goes up through the *Athyris* bed and we made a good collection in this layer.

We did not see the overlying coral bed but this is the horizon that yielded *Strombodes* and which may = the base of the Callaway and the *Mineola* in which case Callaway would = *waterlooensis* (and *Pentamerella* coral zone) through the Coralville. The *Bellula* zone is undoubtedly missing from central Missouri.

(82)

2026

September 11

Went from Madison to Lake Church which is $\frac{1}{2}$ mile east of Wis. Hy 141 8 miles N of Port Washington. The quarry is 1 mile E + $\frac{1}{2}$ mile S of Lake Church. Now filled with water within a few feet of top. Upper rock light gray brown dolomite in thick layers. *Strophodont* *musculosa* and *Perrinitophyllum* occur in the ledges on S side quarry and as low as 5-10' below top. The *Chonetes* beds were not seen and are undoubtedly under water.

The *Chonetes* beds must belong to the Dundee as no such *Chonetes* occurs in the Cedar Valley and *Chonetes* is a rare Cedar Valley fossil. The *C. schuchertianus* = the *Chonetes* in the Rapid.

The *Strophodont* *musculosa* beds might have Cedar Valley affinities but if *Chonetes* is abundant in these beds that idea probably will not work.

From Lake Church went south and looked at cut in Thiensville formation on Wis. Hy 57 about 2 miles north of

Thiensville. Then we went down to the Milwaukee Museum and had a look at the collections there. These collections of Milwaukee formation are quite small. Returned to Port Washington for night.

September 12

Went to Dmackers quarry, 3.5 miles north of Port Washington and $1\frac{3}{4}$ mile N of Knellsville where the road trifurcates. The middle fork goes to quarry which is located beside the RR track. The Devonian is about 6-8' thick of light tan dolomite in layers about 2"-4" thick. The *Fimbriospira* occurs 5' above the Silurian. *Spyridula* was taken just above it and the fine-lined *Atrypa* occur with *Fimbriospira* and *Spyridula*. Probably the whole of the Lake Church is Delaware and none of it correlates with the Rogers City.

(84)

2020

September 13.

Packed fossil all day.
Send Newell several genera
of brachiopods (Recent) showing
loops. Mount up two for
display.

Send Norman negatives of
my silicified fossil talk and of
Storm-rollers.

Loc 1413 E. of mouth of Beezie R
on reef, middle of Beezie fm.
Gift from W. H. Trenchhofel.

September 14.

Spent day with Trenchhofel and
Newell.

September 15.

N. D. Newell
% Nellie M. Newell
161 N. Oak St.,
London, Ohio

Send Workman samples
of about 20 grams each from
the various layers of the
Bakeoven sequence above
Microcyclus

(85)

2020

September 16

Spent day with Workman at Illinois Geol. Survey office. Workman is getting ready his big study of the Illinois subsurface. In eastern Illinois he has a big development of Wapsipineon which fingers southwestward as it thins down into Dutch Creek. This is overlain by Cedar Valley which is generally regarded as equivalent to the Hamilton. Workman and the Illinois crowd seem to think that the Wapsipineon is of Onondaga age.

According to these people the Geneva occurs under the Jeffersonville and thus may be ~~the~~ Detroit River and not the lateral equivalent of the Jeffersonville. Mr. Campbell claimed the Geneva as a separate formation also.

(86)

2030

Check Linnwood-Kenwood on chart

Look up Mississippian corals
for Easton.

Send Cooper some plates of
shale with *Paraspiifer*.

Test the idea that all the
Hamilton above the coral bed
with *Tropidoleptus* in Perry County
is Tully and = to the Alb. That
Stenoceras fossils could possibly
admit such things as *Lingulella*
in the Tully.

Mr. Anderson of Gulf at Mattoon

Savage collections
U. of Illinois

Sp. acuminatus No. D-2813 complete
specimen partially matrix covered
Fairly wide hinge. Might be *P.*
acuminatus. Borham

856h from Bake-oven-3
specimens all fragmentary. 2 are
not *Paraspiifer* but one is a
good *Paraspiifer*. Lithology is Delaware
No locality other than Jackson County

555v contains one *Paraspiifer*
the counterpart to 556h above.
One other crushed ventral in the

(87)

2031

lot is apparently a *Paraspirifer*
555 ~~the~~ - ? *Paraspirifer*
556 b - probably not *Paraspirifer*

Camerozonia is OK but does
not look like *gainesi*


556 u *Strophonella* n. sp. is a
genuine *Strophonella*

56 d - *Chonetes yandellanus*
looks like the *Chonetes* zone
20' below *Microcyclus*.

Spirifer gregarius - 555 e - 6
specimens prove all to be *Cyrtina*

Megalantaris - 556 p = *Platydorrella*
and *Strophodonts*.

Spirifer lucasensis from 568 f
is recorded as *Spirifer* n. sp.
No. D424. Mtn. Glen section

Sp. varicosus D420 from 555 d
is cyrtinoid in appearance with
flat hypochline interarea 

A specimen suggesting *S. lucasensis*
is D434 from 556 c. It is
not well preserved but is near
that species.

Dalmanites, 558T, 570, 558g, 558n, 56m, 56p, 558m.

Cameroiphoria gaimesi are in dark or chocolate matrix. The specimens are larger than C. gaimesi and are probably new. Borrow D 505
Horizon 5x.

Sp. n. sp = Sp. lucasensis 568b
D 424 Borrow.

Centronella glansfagea may = n. sp. 558p
D 451.

555e - lot of C. yandellanus D 589
contains Sp. lucasensis on
largest piece in box

556v Centronella in ss.

555m Pentamerella pavillionensis
in chocolate matrix.

D 604 S. patersoni strongly wrinkled

D 2377 excellent smaller specimens

Genuine Pentamerella from 855f

D 610 looks like Xlu Grand Tower

855g - Megalantaris looks like
imperfect Strophodontia and shows
granules of the Strophomenidae.
A second specimen is too poor to
determine.

(89)

2033

Dalmanites 553f in chocolate matrix

553w small *Strophonella*, probably
new in sandy and light xlu matrix

553w - *Nucleospira ventricosa* is ribbed
and suggests a *Pentamerella* dorsal.

D 636 from 555w and called
Athyris vittata is a baby
Pentamerella or *Camerophoria*. At
any rate median septum is present
in ventral valve.

5x *Nucleogrinus* sp. D 700 Bonow
555e - *Tentaculites* contains *Sp. lucasensis*

568b - *Cyrtina* hem. = *Sp. lucasensis*
D 721.

Sp. nov. 553e = *Sp. lucasensis* D 717
" " 568a = " " D 793

553p - *Nucleospira* OK. *ventricosa*?

Glyptodesma erectum 568d is more
likely a *Leiopteria*

556a - *Strophalosia truncata* is a
Productella

558 - *Sp. macrothyris* is called
Hamilton - it can't be.

(90)

2031

S57a - *Spinifer perlamellosa* called Hamilton is like *Spinifer* (lamellose) from Wittenberg).

S56 *Leptaeniscia concava* = St. *inaequistria* type.

S55c has *Athyris*-way = *Microcyclus*

S58e - *Microcyclus*

S79g, S67g - contain fine sp. granular types in a punky sandy rock. Lithologically S79g + S67g may be =.

S79e *Cyclorhina* - looks OK. D1049 Contains *Camerozonia*.

S68j - Sp. *divaricata* type OK
D1071 Borrow

S55d - Sp. *divaricata* very doubtful.

S54x - *Microcyclus* *disans*

Parazyga hirsuta S80i is definitely a *Parazyga*

D2216 *Meristella* *donis* excellent specimen, complete. S79e

Cypriocardinia indenta in oolite
S80g-h.

S68p - NE 1/4 34 - 11S - 2W - all 68s Mtn. Glen section?

S55 = Backbone SE 1/4 10-12 S-2W

S58 = Backbone NW 1/4 35-13S-2W.

S80 must = Dainty Creek?

Loc. 799 in Savage notebook 62, p. 60, 9/5/07
574 - NB 1/4 2-115-3W.

(91)

2035

Alto ls. - no locality - D 2645
Eumella and a *Nucleospira*
former a small free specimen

Spinifer gueri D 2675 OK - no loc.

C. gänesi = n. sp. Backbone D 2727
permission to clean it.

Dolastoceras from Backbone

D 2774 *Cyclorhina speciosa* n. sp.
said to be Alto, No loc.

Mytilarca rectalata n. sp. - Alto
no loc. D 2773

Sp. arguta n. sp. Alto no loc D 2770

Sp. granulosa D 3808 Alto pass ☐

Bossett may = *Sp. divaricatus* Brown
from Single ls.

Canaena subovata near
Andalusia dill. Tapers posteriorly
to form a distinctly ovate outline
The shell is not the same as
the one from Buffalo which is
C. elliptica.

C. elliptica - This is the same
as the shells we have from
Buffalo. *Elliptica* has the low
ventral umbro and beak, whereas
C. subovata has an elongated beak

(92)

2036

C. elliptica. Tapers a little anteriorly but is distinctly shouldered at the postero-lateral extremities.

The huge *Cranaena* from Andalusia is *C. maxima* of Savage and this name may apply also to the Callaway shells.

The *Pugnoides subovata* may not be a *Cameroiphoria*. It should be closely checked. It is not certain that these come from the *Cranaena* beds. Two lateral septa help support the spondylium in one of the specimens.

Charles Summerson
U. of Illinois

Information on Ky Pennsylvanian

Send H. W. Scott, Univ. of Illinois samples of *Estheria* shales or any other freshwater from Devonian.

Took up article in AAPG on Sly Gap.

Divisional geologist Leslie Clark or Rex McSee. Shell at Centralia

Get Dawson on Devonian
of Southern Indiana

(93)

2037

September 19.

Yesterday in ^{Chalmers} Cooper's office saw specimens of *Spirifer lucasensis* etched from the "Grand Tower" at the sinks west of Alto Pass. These beds cannot be far below *Microcyclas* and are probably about the same as the *lucasensis* beds at Mountain Glen and 1.5 miles west of Jonesboro.

Spent day going from Urbana to Cape Girardeau. Called at Centralia to see Leslie M. Clark of Shell Co. He held out little hope of getting well data from his company but I am to write him in late October or November for permission to get cores now in Cloud's possession.

The complete *Sp. acuminatus* in Savages collection has a very sharp fold, sharper than *Sp. acuminatus*. It is much more like *Sp. Bownockeri* to which the species from the Grand Tower may belong.

(94)

2083

Sept. 20

Write C. O. Dunbar and ask if Savage's collections are at Yale.

Examined Remmswick & Magnoheta (Fernvale) on river front just N of the main ST in Cape Girardeau. In the uppermost Fernvale I saw what appeared to be several valves of *McEwenella*, the short narrow variety *M. raymondi* Foerste.

Chronister's place

1 at 8'
6 at 13'
Rest at 17'

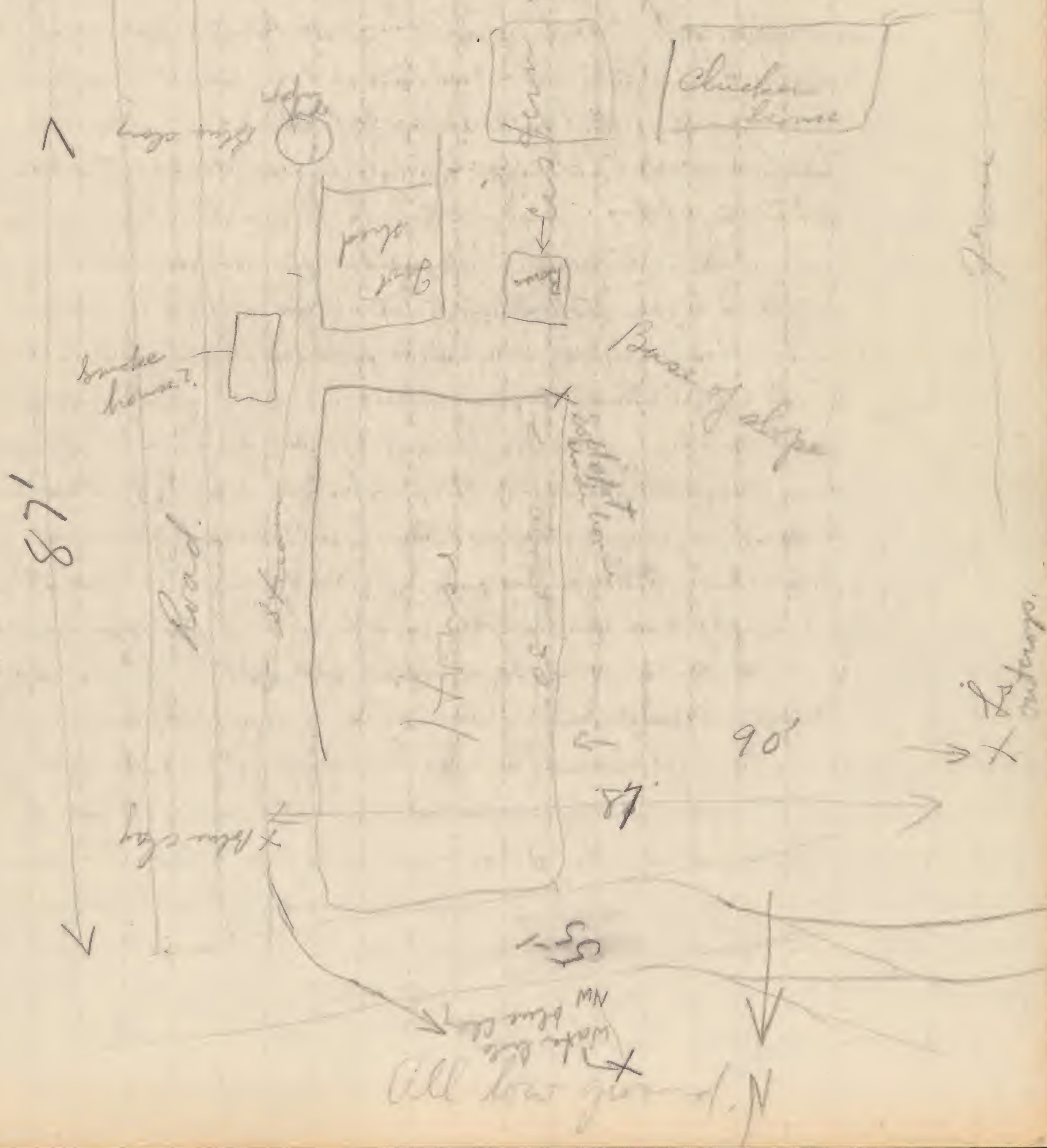
Cistern at SW corner of house just at base of slope which extends upward to the south. First bone at 8 1/2', others down to 17' all in stiff dark clay, resting on limestone. Total hole is 24' about 9' in ls which was blasted out. Also found piece of fossil wood.

C. C. Burns claims this is a sink and old line of sink went along near Chicken house.

House beside ditch from water hole rests on nearly flat ground at very base of slope and must rest on most of clay particularly if

Hole 9' wide at top
6' below

Slope with St Peter
sandstone flat



(95)

2039

O.C. Burns is right about the old sink. Slope has crept over old sink. About 30 yds west of house small block of limestone appears in place about 5' above flat. Slope extends west all along the road. To north of road into house the land is low with a small stream alongside the road. The limestone looks very much like Plattin.

Dirt from well all thrown into bed of road leading to house now mixed with sand and rock.

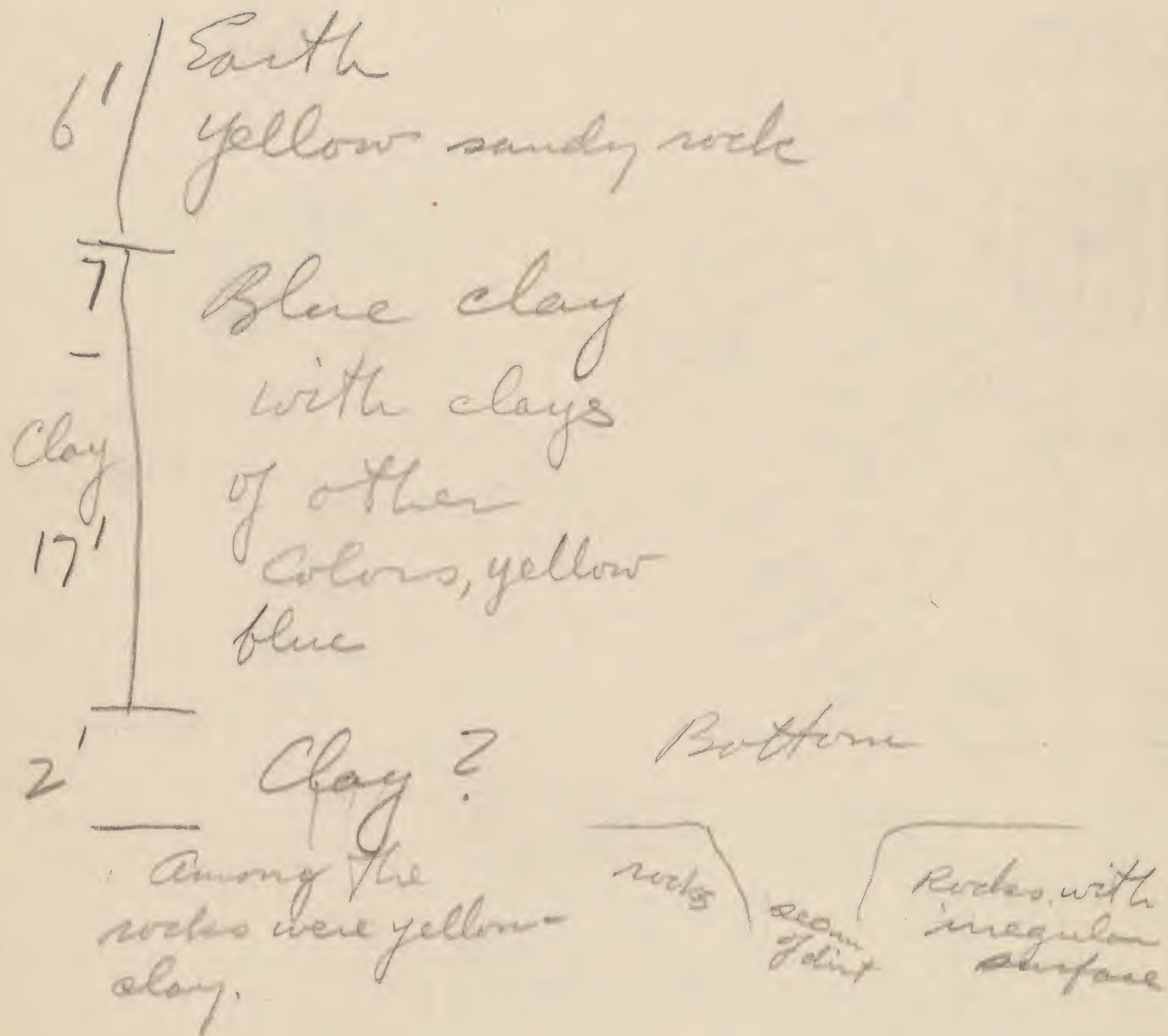
NE corner of house is on a soft space. Blue clay appears in the branch on NE side house and in field to NW of NW corner of house about 5-5'.

The limestone from the well was in form of loose blocks.

Base of slope from back of house through cistern

Bones became more abundant toward the ls.

Family would like \$50 for all the specimens.



The surface of the ls. was very irregular
probably solution

(96)

2040

The 8' bone is smallest, the intermediate ones at 13' and the largest were at 17'.

Chronisters have one more bone.
All buildings will probably have to be moved for the excavation.

(97)

2041

September 21

Collected at Mtn Glen and Darty Creek. In ~~find~~ Glen to north from main road to Alto Pass on road up Darty Creek the Dutch Creek is just N of the ~~old~~ bridge over the little stream. This exposure is in the same stream that Keller had his Grand Tower and is about 50 yds ~~upstream~~ downstream from the Grand Tower. The Grand Tower contained Centronella and is undoubtedly genuine Grand Tower.

September 22

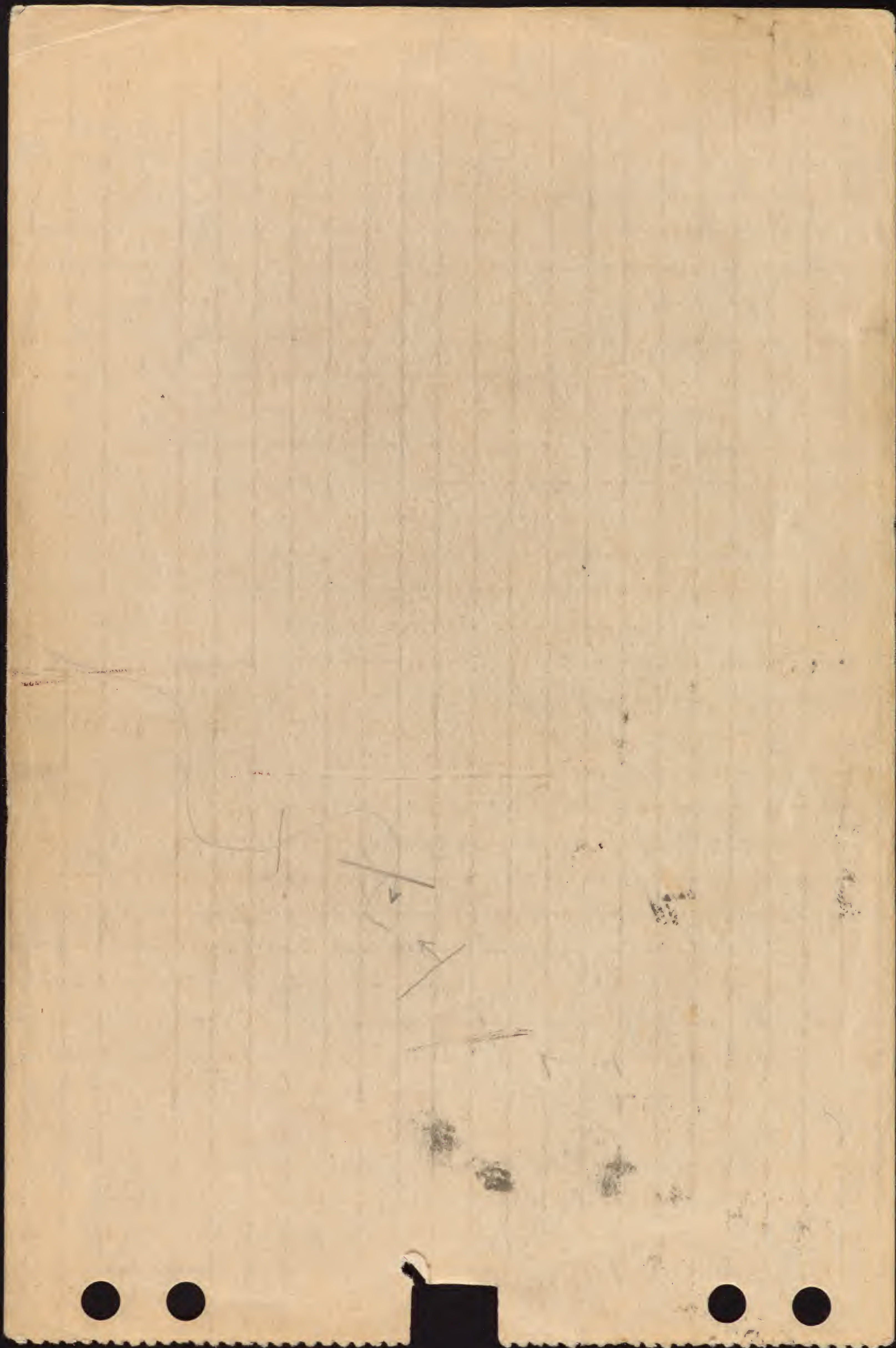
Anna to Mattoon. Called on Mr. C. B. Anderson of Gulf Oil. Well received and given several cores.

Sept. 23.

Spent morning at Gulf offices. Afternoon Mattoon - Knightstown, Indiana.

Sept. 24.

5483?



Sept 12 1964

7g

On N line of sec. 8-34N-6W, about 0.3 mile E of NW cor of section, 1.3 miles east and 0.4 mile N of Bayshore, Bayshore (15') Q, Michigan

mm

Blue shale with fossils in lower 3'

G 20'

F 18'

brown, fine-grained limestone with small *Microspirifer* and *Conocardium*.

E 4"

brownish black shale

D 2'-3'

Hard brown, porous ls. granular, becomes shaly laterally to north

C 4"

brown shale

12-15'

B

Chocolate brown, granular porous limestone, Finger Fossils near bottom

A 5'-6'

Upper blue shale of Pohl.

Bed D changes to shale with many fossils and becomes about 4' thick north along the trench. Shale crinoidal at base and with abundance of a *Pentamerella* suggestive of *P. gettokeyensis*. Lower 5' of B very fossiliferous. Bed B thins to 3 or 4' at north end of cut. Upper part contains many *Pentamerella* and is just under shale of bed D. A = upper Blue; B = Charlevoix; D-G = Petoskey.

Sept 15, 1964

South side road 0.7 mile due west of Posen. Brown bituminous limestone of Newton Creek fm. Few fossils.

515¹ 1964

1.4 miles due West of Posen
on south side of road. Lower
part of outcrop of shale with
Atrypa and *Leptostrophia* for about
2'. Overlying the shale is 2' of
limestone, crinoidal and with
abundance of goniatitoids.
Belongs in lower Alpena.

515² 1964

0.9 mile west of SE cor 7, 2.9 miles
west of Posen. Light gray-weathering
limestone with pink *Tabes*/graptolite
and *Longirophina erumetensis* =
Gravel Point = Alpena.

515³ 1964

Angular massive limestone
with *Pentamerella*, large *Spirifer*,
large *Atrypa* and large *Elythra*, one
mile east and $\frac{1}{2}$ mile South of Lees.
SE cor 5-32N-6E, Alpena Co., Mich.

515⁴ 1964

Exposure on Long Rapids road
at Orchard Hill begins 0.1 mile
W of section corner and extends
for 675', S side NE $\frac{1}{4}$ 31-32N-5E,
Alpena Co. Mich.
Section on next page

Section 0.1 mile W of corner
SE corner NE 1/4 sec. 31.

J	?	like G.
I	3'	covered
H	3'	gray shale, 1/2' of ls 1/2' above base digitate corals, Cranaena, and Athyris
G	7'	Hard, moderately thick-bedded ls., smooth dove-gray with "birds-eyes" and occasional corals. Some thin shale partings.
F	3'	Hard brown limestone with small digitate corals = Cladopora?
E	4'	Shaly gray limestone with many large Cyrtina
D	2'	Shaly blue gray limestone with many fenestellids
C	1'	Hard granular ls.
B	4'	Shaly limestone with many Microspirifer, Pentamerella = 446
A	3'	granular massive limestone

S 15 5 farther W of preceding -
SW cor NE 1/4 sec 31
may be same as upper part
of S 15 4 - Beds G & H. ?

C 2 1/2'

Shaly limestone with ls. bands, digitate
fossils and Stropheodonta

B 2'

Massive bed, many digitate corals,
spaghetti-like stromatopora and large
stromatopora - often overturned

A 8-10'

Platy blue gray limestone, very
flat bedding

B & C probably belong together
A suggests G or I of preceding
section

Genshau

Rabiteau Farm - section
N.E. of Rabiteau house near N
line NW $\frac{1}{4}$ sec. 35-33 N-8 E.,
Presque Isle Co., Mich.

F	2'	Platy limestone with <i>G. romingeri</i> and round, globular <i>Pentamerella</i>
E	1 $\frac{1}{2}$ '	crumbly shale with small brachiopods - <i>Helaspis</i> common
D	3"	limestone
C	3'	crumbly shale like A with <i>G. romingeri</i>
B	6"	limestone with numerous <i>Hexagonaria</i>
A	1 $\frac{1}{2}$ '	crumbly limey, nodular shale with numerous small brachiopods: <i>chonetids</i> , <i>Stropheodonta</i> , <i>G. romingeri</i>